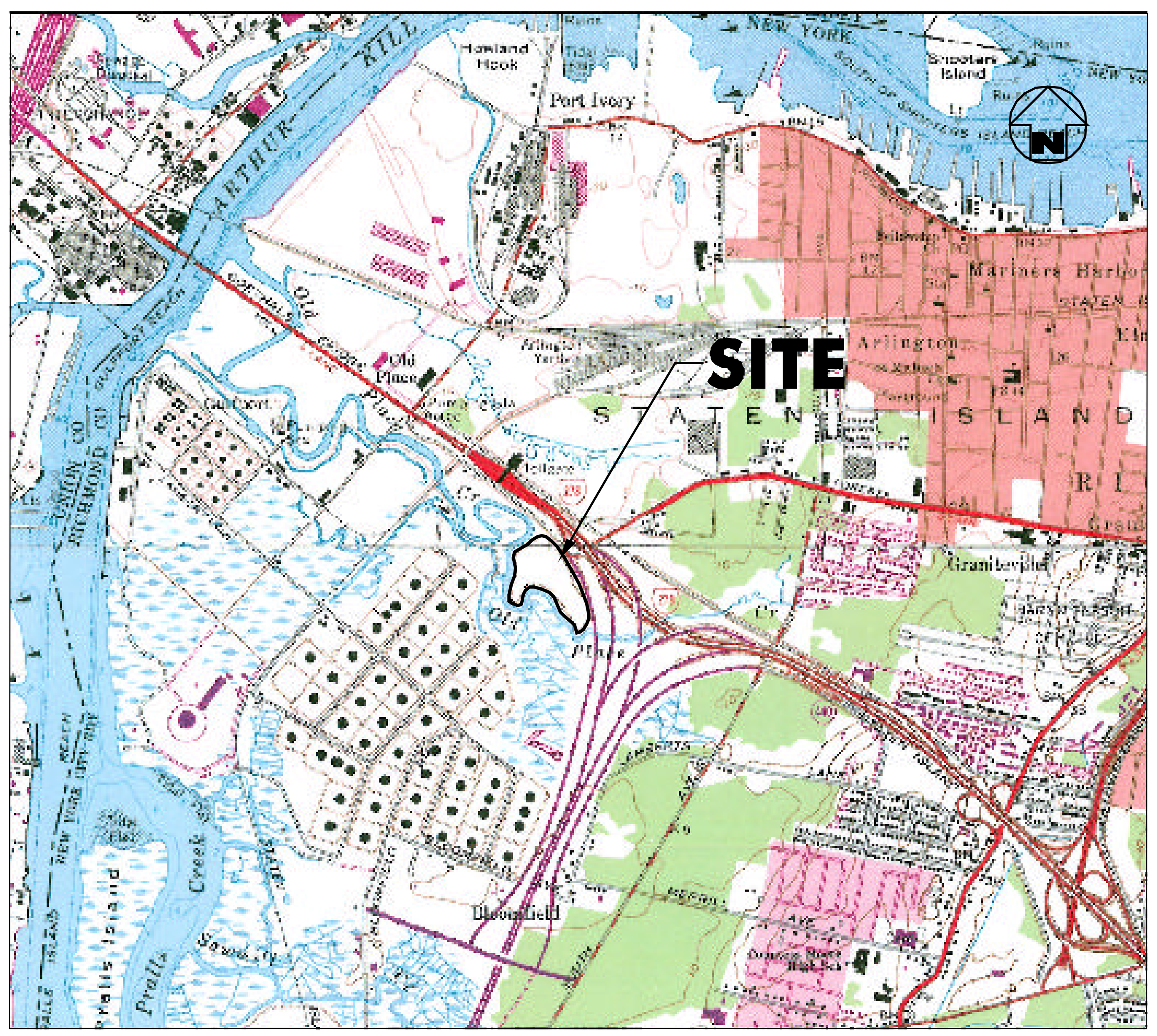
US Army Corps
of Engineers
New York District

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION
STATEN ISLAND, NY

CONTRACT No.:



KEY MAP
N.T.S.

SHEET #	TITLE
1	COVER SHEET
2	EXISTING CONDITIONS PLAN
3	SOIL EROSION & SEDIMENT CONTROL PLAN
4	GRADING PLAN
5	LANDSCAPE PLAN
6	PLANTING SCHEDULE
7	CONSTRUCTION PHASING PLAN
8	CROSS SECTIONS SHEET 1
9	CROSS SECTIONS SHEET 2
10	CROSS SECTIONS SHEET 3
11	TYPICAL DETAILS SHEET 1
12	TYPICAL DETAILS SHEET 2
13	BORING LOGS SHEET

Symbol | Description | Date | Appr.

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER NO. 72903

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: BB | Dwn by: SH | Ckd by: BC | Reviewed by: | Date: April 2005 | Drawing file no.: | Drawing code: | Size | Rev.:

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION
COVER SHEET
STATEN ISLAND
NEW YORK

Sheet reference number: 1

EXISTING ACREAGE BY COMMUNITY TYPE

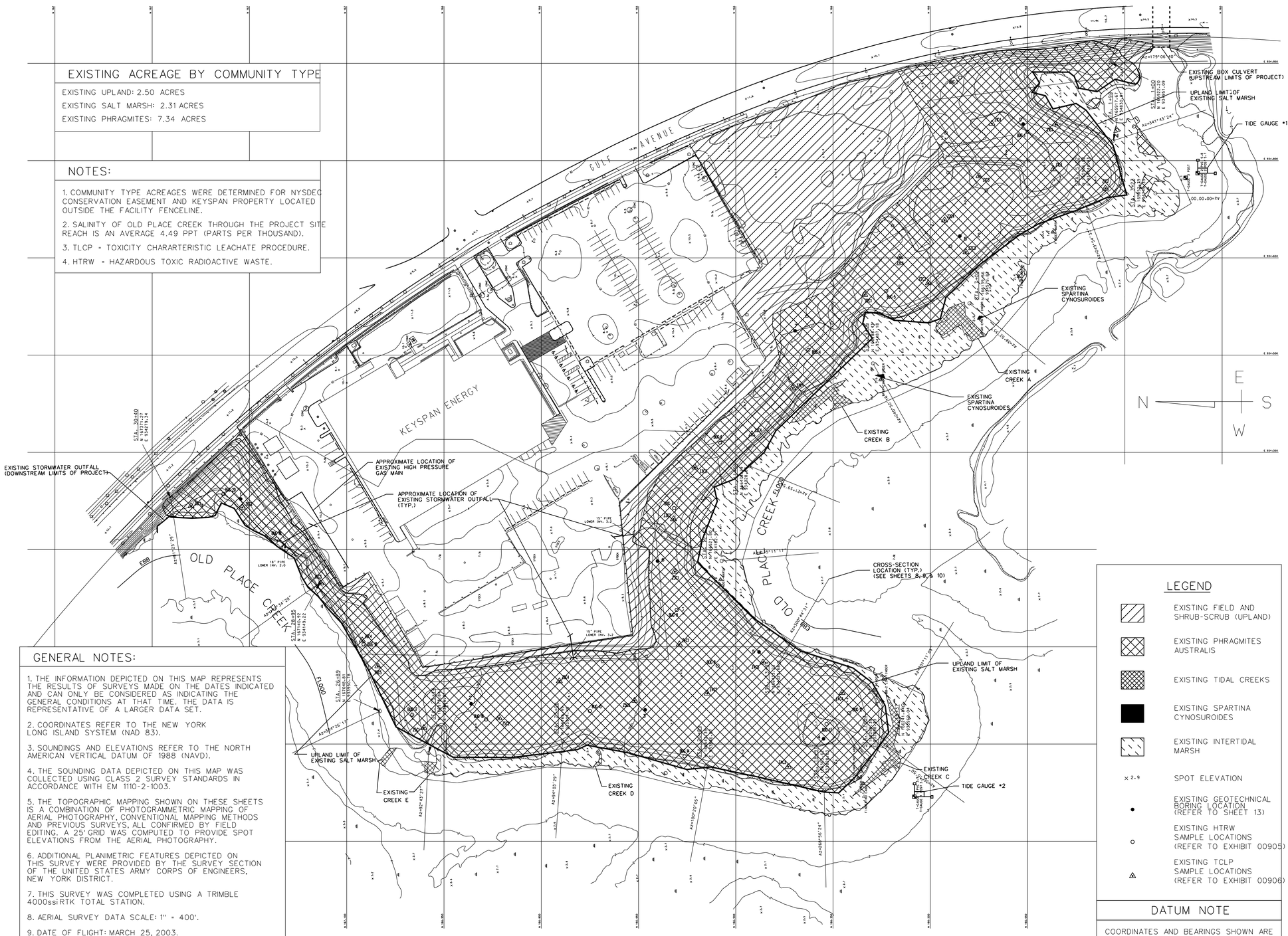
EXISTING UPLAND: 2.50 ACRES

EXISTING SALT MARSH: 2.31 ACRES

EXISTING PHRAGMITES: 7.34 ACRES

NOTES:

1. COMMUNITY TYPE ACREAGES WERE DETERMINED FOR NYSDEC CONSERVATION EASEMENT AND KEYSPAN PROPERTY LOCATED OUTSIDE THE FACILITY FENCELINE.
2. SALINITY OF OLD PLACE CREEK THROUGH THE PROJECT SITE REACH IS AN AVERAGE 4.49 PPT (PARTS PER THOUSAND).
3. TLCP - TOXICITY CHARARTERISTIC LEACHATE PROCEDURE.
4. HTRW - HAZARDOUS TOXIC RADIOACTIVE WASTE.



SCALE: 1" = 60'

60 0 60 120 180

GENERAL NOTES:

1. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THAT TIME. THE DATA IS REPRESENTATIVE OF A LARGER DATA SET.
2. COORDINATES REFER TO THE NEW YORK LONG ISLAND SYSTEM (NAD 83).
3. SOUNDINGS AND ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD).
4. THE SOUNDING DATA DEPICTED ON THIS MAP WAS COLLECTED USING CLASS 2 SURVEY STANDARDS IN ACCORDANCE WITH EM 1110-2-1003.
5. THE TOPOGRAPHIC MAPPING SHOWN ON THESE SHEETS IS A COMBINATION OF PHOTOGRAMMETRIC MAPPING OF AERIAL PHOTOGRAPHY, CONVENTIONAL MAPPING METHODS AND PREVIOUS SURVEYS, ALL CONFIRMED BY FIELD EDITING. A 25' GRID WAS COMPUTED TO PROVIDE SPOT ELEVATIONS FROM THE AERIAL PHOTOGRAPHY.
6. ADDITIONAL PLANIMETRIC FEATURES DEPICTED ON THIS SURVEY WERE PROVIDED BY THE SURVEY SECTION OF THE UNITED STATES ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT.
7. THIS SURVEY WAS COMPLETED USING A TRIMBLE 4000ssi RTK TOTAL STATION.
8. AERIAL SURVEY DATA SCALE: 1" = 400'.
9. DATE OF FLIGHT: MARCH 25, 2003.
10. ADDITIONAL MAPPING & BATHYMETRY COMPLETED MAY, 2003.
11. CONTOUR INTERVAL IS ONE-FOOT.

LEGEND

- EXISTING FIELD AND SHRUB-SCRUB (UPLAND)
- EXISTING PHRAGMITES AUSTRALIS
- EXISTING TIDAL CREEKS
- EXISTING SPARTINA CYNOSUROIDES
- EXISTING INTERTIDAL MARSH
- x 2.9 SPOT ELEVATION
- EXISTING GEOTECHNICAL BORING LOCATION (REFER TO SHEET 13)
- EXISTING HTRW SAMPLE LOCATIONS (REFER TO EXHIBIT 00905)
- EXISTING TCLP SAMPLE LOCATIONS (REFER TO EXHIBIT 00906)

DATUM NOTE

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ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

US Army Corps of Engineers
New York District

Jayne Wame, P.E.
N.Y. PROFESSIONAL ENGINEER NO. 72903

No.	Description	Date	App.

Designed by: BB	Drawn by: BC	Checked by: SH	Reviewed by:

Date: April 2005
Drawing file no.
Drawing code:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION
STATEN ISLAND
NEW YORK

EXISTING CONDITIONS PLAN

Sheet reference number: 2

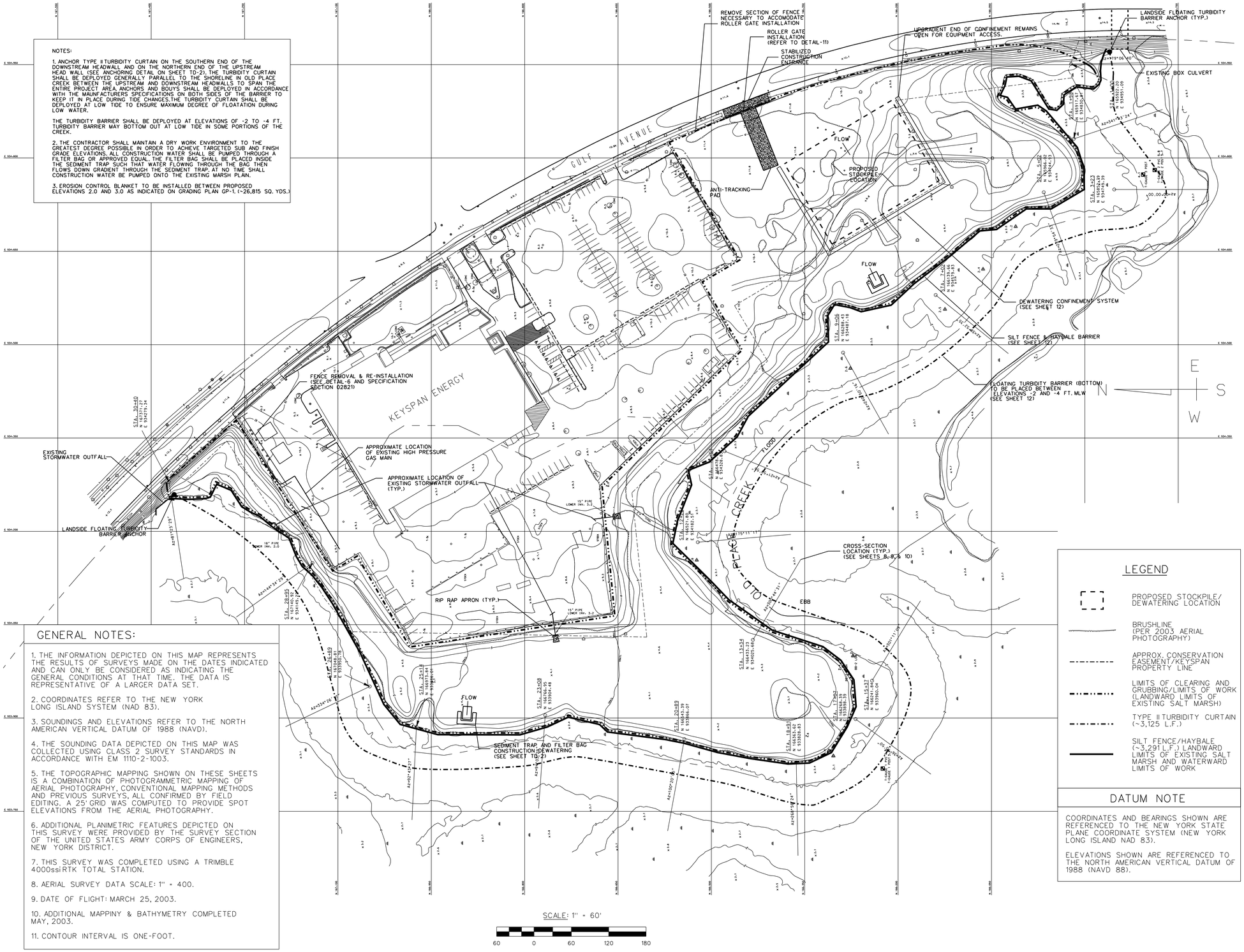
NOTES:

1. ANCHOR TYPE II TURBIDITY CURTAIN ON THE SOUTHERN END OF THE DOWNSTREAM HEADWALL AND ON THE NORTHERN END OF THE UPSTREAM HEAD WALL (SEE ANCHORING DETAIL ON SHEET TO-2). THE TURBIDITY CURTAIN SHALL BE DEPLOYED GENERALLY PARALLEL TO THE SHORELINE IN OLD PLACE CREEK BETWEEN THE UPSTREAM AND DOWNSTREAM HEADWALLS TO SPAN THE ENTIRE PROJECT AREA. ANCHORS AND BOUYS SHALL BE DEPLOYED IN ACCORDANCE WITH THE MAUNFACTURERS SPECIFICATIONS ON BOTH SIDES OF THE BARRIER TO KEEP IT IN PLACE DURING TIDE CHANGES. THE TURBIDITY CURTAIN SHALL BE DEPLOYED AT LOW TIDE TO ENSURE MAXIMUM DEGREE OF FLOATATION DURING LOW WATER.

   THE TURBIDITY BARRIER SHALL BE DEPLOYED AT ELEVATIONS OF -2 TO -4 FT. TURBIDITY BARRIER MAY BOTTOM OUT AT LOW TIDE IN SOME PORTIONS OF THE CREEK.

2. THE CONTRACTOR SHALL MAINTAIN A DRY WORK ENVIRONMENT TO THE GREATEST DEGREE POSSIBLE IN ORDER TO ACHIEVE TARGETED SUB AND FINISH GRADE ELEVATIONS. ALL CONSTRUCTION WATER SHALL BE PUMPED THROUGH A FILTER BAG OR APPROVED EQUAL. THE FILTER BAG SHALL BE PLACED INSIDE THE SEDIMENT TRAP SUCH THAT WATER FLOWING THROUGH THE BAG THEN FLOWS DOWN GRADIENT THROUGH THE SEDIMENT TRAP. AT NO TIME SHALL CONSTRUCTION WATER BE PUMPED ONTO THE EXISTING MARSH PLAIN.

3. EROSION CONTROL BLANKET TO BE INSTALLED BETWEEN PROPOSED ELEVATIONS 2.0 AND 3.0 AS INDICATED ON GRADING PLAN GP-1. (~26,815 SQ. YDS.)



GENERAL NOTES:

1. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THAT TIME. THE DATA IS REPRESENTATIVE OF A LARGER DATA SET.

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3. SOUNDINGS AND ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD).

4. THE SOUNDING DATA DEPICTED ON THIS MAP WAS COLLECTED USING CLASS 2 SURVEY STANDARDS IN ACCORDANCE WITH EM 1110-2-1003.

5. THE TOPOGRAPHIC MAPPING SHOWN ON THESE SHEETS IS A COMBINATION OF PHOTOGRAMMETRIC MAPPING OF AERIAL PHOTOGRAPHY, CONVENTIONAL MAPPING METHODS AND PREVIOUS SURVEYS, ALL CONFIRMED BY FIELD EDITING. A 25' GRID WAS COMPUTED TO PROVIDE SPOT ELEVATIONS FROM THE AERIAL PHOTOGRAPHY.

6. ADDITIONAL PLANIMETRIC FEATURES DEPICTED ON THIS SURVEY WERE PROVIDED BY THE SURVEY SECTION OF THE UNITED STATES ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT.

7. THIS SURVEY WAS COMPLETED USING A TRIMBLE 4000ssi RTK TOTAL STATION.

8. AERIAL SURVEY DATA SCALE: 1" = 400.

9. DATE OF FLIGHT: MARCH 25, 2003.

10. ADDITIONAL MAPPINY & BATHYMETRY COMPLETED MAY, 2003.

11. CONTOUR INTERVAL IS ONE-FOOT.

SCALE: 1" = 60'

60 0 60 120 180

LEGEND

- PROPOSED STOCKPILE/ DEWATERING LOCATION
- BRUSHLINE (PER 2003 AERIAL PHOTOGRAPHY)
- APPROX. CONSERVATION EASEMENT/KEYSPAN PROPERTY LINE
- LIMITS OF CLEARING AND GRUBBING/LIMITS OF WORK (LANDWARD LIMITS OF EXISTING SALT MARSH)
- TYPE II TURBIDITY CURTAIN (~3,125 L.F.)
- SILT FENCE/HAYBALE (~3,291 L.F.) LANDWARD LIMITS OF EXISTING SALT MARSH AND WATERWARD LIMITS OF WORK

DATUM NOTE

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US Army Corps of Engineers
New York District

Date | Description | Appr.

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER NO. 72900

Size: Plan | Dated: 2005 | Drawing file no.: | Drawing code:
Designed by: BB | Drawn by: BC | Chkd. by: SH | Reviewed by:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

BROOKLYN-UNION GAS SITE
BAY MARGE CONSTRUCTION

SOIL EROSION & SEDIMENT CONTROL PLAN

STATEN ISLAND
NEW YORK

Sheet reference number: 3

PROPOSED MITIGATION ACREAGE

EXISTING SALT MARSH: 2.31 ACRES

PROPOSED LOW MARSH: 3.21 ACRES

PROPOSED HIGH MARSH: 0.87 ACRES

PROPOSED INTERPLANTING MARSH: 1.31 ACRES

PROPOSED MARITIME SCRUB: 1.27 ACRES

TOTAL RESTORATION/ENHANCEMENT ACREAGE: 8.97 ACRES

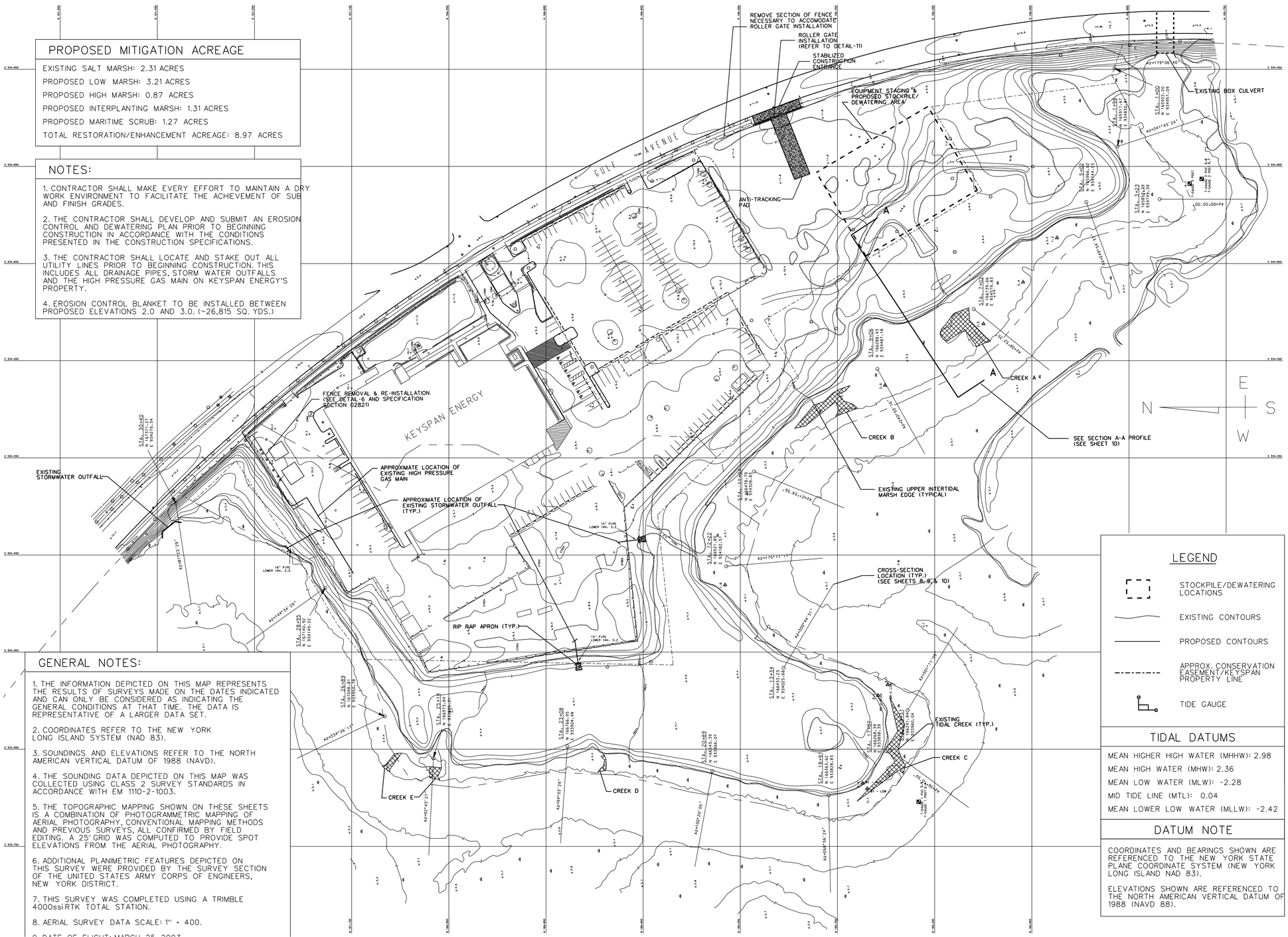
NOTES:

1. CONTRACTOR SHALL MAKE EVERY EFFORT TO MAINTAIN A DRY WORK ENVIRONMENT TO FACILITATE THE ACHIEVEMENT OF SUB AND FINISH GRADES.

2. THE CONTRACTOR SHALL DEVELOP AND SUBMIT AN EROSION CONTROL AND DEWATERING PLAN PRIOR TO BEGINNING CONSTRUCTION IN ACCORDANCE WITH THE CONDITIONS PRESENTED IN THE CONSTRUCTION SPECIFICATIONS.

3. THE CONTRACTOR SHALL LOCATE AND STAKE OUT ALL UTILITY LINES PRIOR TO BEGINNING CONSTRUCTION. THIS INCLUDES ALL DRAINAGE PIPES, STORM WATER OUTFALLS AND THE HIGH PRESSURE GAS MAIN ON KEYSPAN ENERGY'S PROPERTY.

4. EROSION CONTROL BLANKET TO BE INSTALLED BETWEEN PROPOSED ELEVATIONS 2.0 AND 3.0. (~26,815 SQ. YDS.)



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60 0 60 120 180

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8. AERIAL SURVEY DATA SCALE: 1" = 400.

9. DATE OF FLIGHT: MARCH 25, 2003.

10. ADDITIONAL MAPPINY & BATHYMETRY COMPLETED MAY, 2003.

11. CONTOUR INTERVAL IS ONE-FOOT.

LEGEND

- STOCKPILE/DEWATERING LOCATIONS
- EXISTING CONTOURS
- PROPOSED CONTOURS
- APPROX. CONSERVATION EASEMENT/KEYSPAN PROPERTY LINE
- TIDE GAUGE

TIDAL DATUMS

MEAN HIGHER HIGH WATER (MHHW): 2.98

MEAN HIGH WATER (MHW): 2.36

MEAN LOW WATER (MLW): -2.28

MID TIDE LINE (MTL): 0.04

MEAN LOWER LOW WATER (MLLW): -2.42

DATUM NOTE

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US Army Corps of Engineers
New York District

Appr. | Date | Description

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER NO. 72900

Sheet Rev.
Date: April 2005
Drawing file no.:
Drawing code:
Designed by: BB
Drawn by: BH
Checked by: BJC
Reviewed by:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION

GRADING PLAN

STATEN ISLAND
NEW YORK

Sheet reference number: 4

PLANTING ZONES

- ZONE 1 - LOW MARSH
- ZONE 2 - HIGH MARSH
- ZONE 3 - MARITIME SCRUB/SHRUB
- ZONE 4 - INTERPLANTING MARSH

PROPOSED MITIGATION ACREAGE

EXISTING INTERTIDAL MARSH: 2.31 ACRES
PROPOSED LOW MARSH: 3.21 ACRES
PROPOSED HIGH MARSH: 0.87 ACRES
PROPOSED INTERPLANTING MARSH: 1.31 ACRES
PROPOSED MARITIME SCRUB/SHRUB: 1.27 ACRES
TOTAL RESTORATION/ENHANCEMENT ACREAGE: 8.97 ACRES

NOTES:

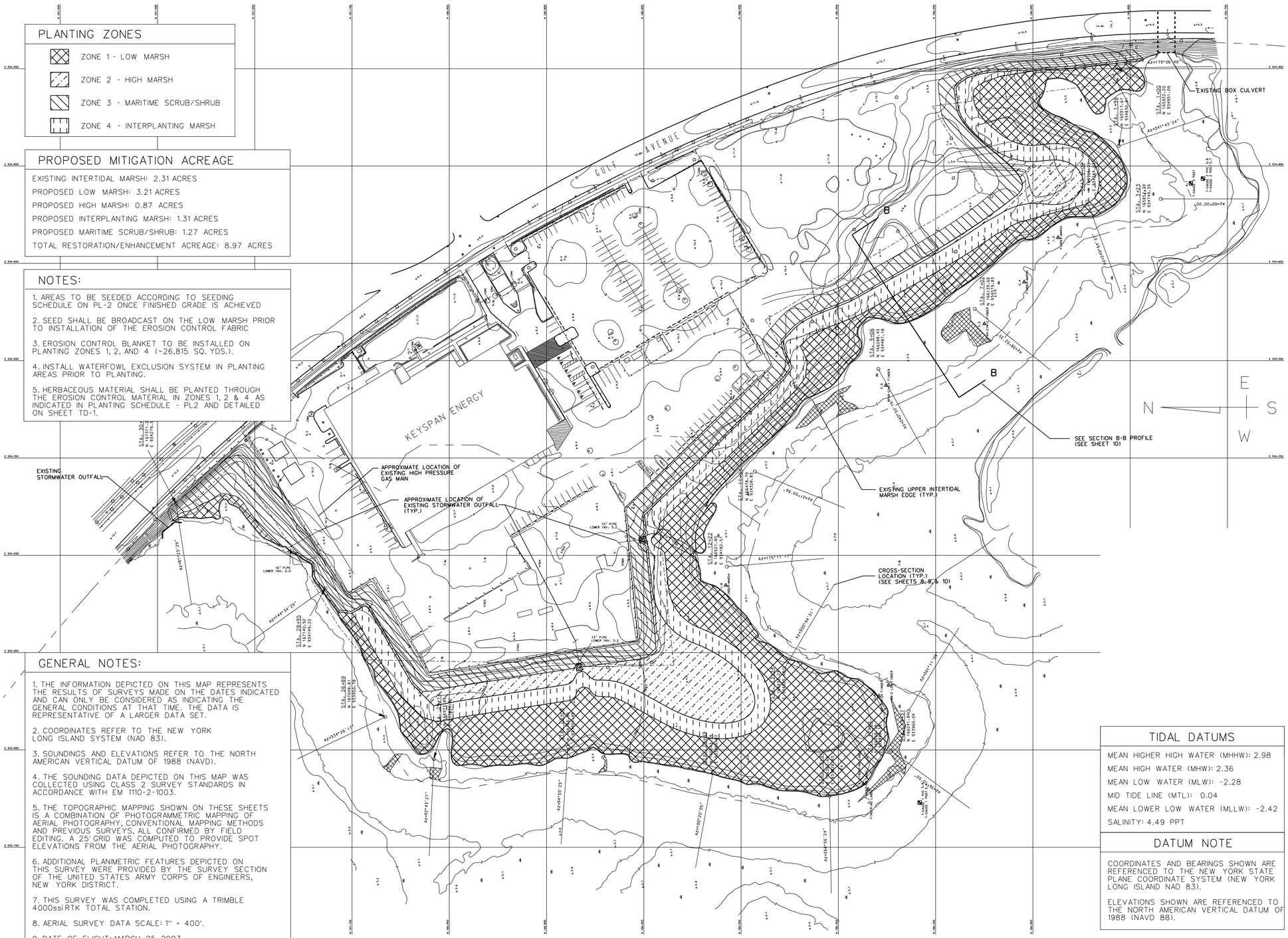
1. AREAS TO BE SEEDED ACCORDING TO SEEDING SCHEDULE ON PL-2 ONCE FINISHED GRADE IS ACHIEVED

2. SEED SHALL BE BROADCAST ON THE LOW MARSH PRIOR TO INSTALLATION OF THE EROSION CONTROL FABRIC

3. EROSION CONTROL BLANKET TO BE INSTALLED ON PLANTING ZONES 1, 2, AND 4 (~26,815 SQ. YDS.).

4. INSTALL WATERFOWL EXCLUSION SYSTEM IN PLANTING AREAS PRIOR TO PLANTING.

5. HERBACEOUS MATERIAL SHALL BE PLANTED THROUGH THE EROSION CONTROL MATERIAL IN ZONES 1, 2 & 4 AS INDICATED IN PLANTING SCHEDULE - PL2 AND DETAILED ON SHEET TD-1.



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MEAN HIGHER HIGH WATER (MHHW): 2.98
MEAN HIGH WATER (MHW): 2.36
MEAN LOW WATER (MLW): -2.28
MID TIDE LINE (MTL): 0.04
MEAN LOWER LOW WATER (MLLW): -2.42
SALINITY: 4.49 PPT

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US Army Corps of Engineers
New York District

Jayne Warne, P.E.
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Dwn. by:	SH	Chkd. by: BJC	Drawing file no.:
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U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

BROOKLYN UNION GAS SITE
SOLI MARSH RESTORATION

LANDSCAPE PLAN

STATEN ISLAND
NEW YORK

Sheet reference number: 5

PLANTING SCHEDULE

COMMON NAME	SCIENTIFIC NAME	SPACING	CONDITION	QTY
ZONE 1 - LOW MARSH (El. 2.0 - 2.2)				
Saltwater Cord Grass	Spartina alterniflora	18" O.C.	2" plugs containing 3-4 sprigs	55,930
Salt Reed Grass	Spartina cynosuroides	18" O.C.	2" plugs containing 3-4 sprigs	6,215
ZONE 4 - INTERPLANTING MARSH (El. 2.2 - 2.4)				
Saltwater Cord Grass	Spartina alterniflora	18" O.C.		2,535
Salt Marsh Hay	Spartina patens	1' O.C. in mixed assemblage w/ Distichlis	2" plugs containing 3-4 sprigs	14,265
Salt Reed Grass	Spartina cynosuroides	18" O.C. sporadically in groups of 3-5 *	2" plugs containing 3-4 sprigs	1,270
Spike Grass	Distichlis spicata	1' O.C. in mixed assemblages w/ Spartina patens	2" plugs containing 3-4 sprigs	9,985
		ZONE 2 - HIGH MARSH (El. 2.4 - 3.0)		
Salt Marsh Hay	Spartina patens	1' O.C. in mixed assemblage w/ Distichlis	2" plugs containing 3-4 sprigs	10,115
Spike Grass	Distichlis spicata	1' O.C. in mixed assemblages w/ Spartina patens	2" plugs containing 3-4 sprigs	6,745
Marsh Elder	Iva frutescens	4' O.C/regular intervals,groups of 3-5 **	3-4', 1-2 gal. container	190
Groundsel Tree	Baccharis halimifolia	4' O.C/regular intervals,groups of 3-5 **	1 gal. container	50
ZONE 3 - MARITIME SCRUB / SHRUB AREA (El. 3.0 - 9.0)				
Groundsel Tree	Baccharis halimifolia	4' O.C/regular intervals,groups of 3-5 ***	1 gal. container	150
Switch Grass	Panicum virgatum	2' O.C/regular intervals groups of 3-5	2" plugs containing 3-4 sprigs	4,150
Little Bluestem	Andropogon scoparius	2' O.C/regular intervals around Panicum	2" plugs containing 3-4 sprigs	920
Indian Grass	Sorghastrum nutans	2' O.C/regular intervals around Panicum	2" plugs containing 3-4 sprigs	920
Big Blue Stem	Andropogon gerardii	2"' O.C./regular intervals around Panicum	2" plugs containing 3-4 sprigs	920
Hackberry	Celtis occidentalis	10' O.C.	1" caliper, 5-7 gal. container	65
Staghorn Sumac	Rhus typhina	6' O.C./regular intervals groups of 3-5	2-3', 1-2 gal. container	205
Bayberry	Myrica pensylvanica	6' O.C/regular intervals groups of 3-5	2-3', 1-2 gal. container	205
Rugosa Rose	Rosa rugosa	6' O.C./regular intervals groups of 3-5	2-3', 1-2 gal. container	205
Pitch pine	Pinus rigida	10' O.C.	1" caliper, 5-7 gal. container	65
Black Jack Oak	Quercus marilandica	10' O.C.	1.5" caliper, 5-7 gal. container	65

SEEDING SCHEDULE

COMMON NAME	SCIENTIFIC NAME	APPLICATION RATE
ZONES 1 & 4 - LOW MARSH AND INTERPLANTING MARSH (El. 2.0 - 2.4)		
Saltwater Cord Grass	Spartina alterniflora	15 PLS/Sq. Ft.
ZONE 2 - HIGH MARSH (El. 2.4 - 3.0)		
Seaside Goldenrod	Solidago sempervirens	2 lbs/acre
Indian Hemp	Apocynum cannabinum	1 lbs/acre
ZONE 3 - MARITIME SCRUB / SHRUB AREA (El. 3.0 - 9.0)		
NE Native Warm Season Grass Mix [2]		25 lbs/acre
Deertongue	*Panicum clandestinum*	
Creeping Red Fescue	*Festuca rubra*	
Switch Grass	*Panicum virgatum*	
Little Bluestem	*Andropogon scoparius*	
Big Bluestem	*Andropogon gerardii*	
Indian Grass	*Sorghastrum nutans*	
Silky Wild Rye	*Elymus villosus*	
Canada Wild Rye	*Elymus canadensis*	
Sand Dropseed	*Sporobolus cryptandrus*	
Staghorn Sumac	Rhus typhina	2 lbs/acre [3]
Joe Pye Weed	Eupatorium fistulosum	1 lb/acre
Spotted Joe Pye Weed	Eupatorium maculatum	1 lb/acre
Common Sneezeweed	Helenium autumnale	2 lbs/acre
Evening Primrose	Oenothera biennis	10 lbs/acre
Virginia Creeper	Parthenocissus quinquefolia	6 lbs/acre
Common Milkweed	Asclepias syriaca	10-12 lbs/acre
Butterfly Milkweed	Asclepias tuberosa	10-12 lbs/acre
TEMPORARY COVER (Maritime Scrub Transition Area)		
Annual Winter Rye	Lolium multiflorum	50 lbs/acre

NOTES:

1) SEED SHALL BE BROADCAST OR HYDROSEEDED (MECHANICALLY DISPERSING SEEDS) UPON COMPLETION OF FINAL GRADING.

2) SPARTINA ALTERNIFLORA SEED SHALL BE MIXED W/AN EQUAL VOLUME OF SAND TO ENSURE EVEN COVERAGE DURING APPLICATION.

3) THE SPARTINA ALTERNIFLORA SEED CAN BE SEEDED IN THE SPRING BETWEEN MAY 15 AND JUNE 30 OR AS A DORMANT SEASON SEEDING BETWEEN SEPTEMBER 15 AND OCTOBER 30.

4) THE NE WARM SEASON GRASS MIX AND ADDITIONAL SPECIES INDICATED IN THE SEEDING SCHEDULE SHOULD BE BROADCAST AS A DORMANT SEASON SEEDING BETWEEN SEPTEMBER 15 AND OCTOBER 30.

5) ALL HERBACEAUS PLANT MATERIAL (PLUGS) SHALL BE INSTALLED BETWEEN MAY 15 AND JUNE 30.

6) ALL WOODY PLANT MATERIAL SHALL BE INSTALLED IN THE SPRING PLANTING WINDOW (APRIL15-JUNE 15) OR THE FALL PLANTING WINDOW (SEPTEMBER 15-OCTOBER 30).

7) EROSION CONTROL BLANKET SHALL BE INSTALLED IMMEDIATELY AFTER SEEDING. SEEDING SHALL OCCUR DURING LOW TIDE INTERVALS AND COVERED W/EROSION CONTROL BLANKET PRIOR TO THE ONSET OF THE NEXT FLOOD TIDE.

8) WATERFOWL EXCLUSION SYSTEM SHALL BE INSTALLED PRIOR TO INSTALLING SPECIFIED PLANT MATERIAL

9) PLANTING SCHEDULE IS DIVIDED INTO ZONES THAT CORRESPOND WITH THE ZONES SHOWN ON THE PLANTING PLAN.

10) THE PLACEMENT AND INSTALLATION OF INDIVIDUAL PLANTS SHALL BE CONDUCTED UNDER THE DIRECTION OF THE PROJECT BIOLOGIST.

* Spartina cynosuroides willbe distributed randomly throughout planting area to approximate coverage from adjacent marsh. These clumps should be placed on high points dictated by microtopographic variation created by finish grading. Spartina cynosuroides intended to cover 5% of this planting area.

** Iva frutescens and Baccharis halimifolia to be planted in upper 10% of high marsh planting zone, with Baccharis halimifolia up-slope of Iva frutescens.

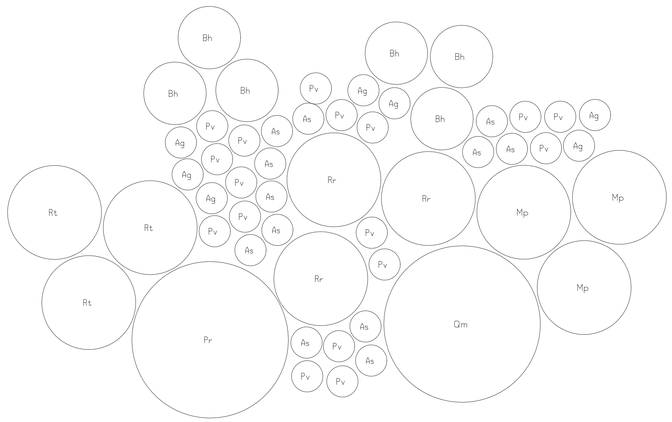
*** Baccharis halimfolia to be planted in lower 5% (toe-of-slope) of the maritime scrub/shrub transition area.

[1] Only the upper 10% of the High Marsh Area willbe seeded with the indicated species.

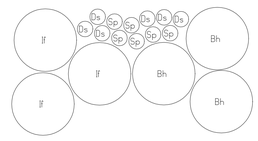
[2] Panicum clandestinum, Festuca rubra, Panicum virgatum, Andropogon scoparius, Andropogon gerardii, Sorghastrum nutans, Elymus villosus, Elymus canadensis and Sporobolus cryptandrus are the components of NE Warm Season Grass Mix.

[3] Seeding of these species is not included with the Seeding of the NE Warm Season Grass Mix.

ZONE 1 (TYP.)
SCALE: 1" = 4'



ZONE 3 (TYP.)
SCALE: 1" = 4'



ZONE 2 (TYP.)
SCALE: 1" = 4'

ZONE 4 (TYP.)
SCALE: 1" = 4'

TYPICAL PLANTING DETAILS

U.S. Army Corps of Engineers
New York District

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER NO. 72926

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: BB
Drawn by: SH
Cad by: BC
Reviewed by:
Date: April 2006
Drawing file no.:
Drawing code:
Size: Rev.:

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION
STATEN ISLAND
NEW YORK

PLANTING SCHEDULE

Sheet reference number: 6

CONSTRUCTION PHASING NOTES:

A CONSTRUCTION STAGING PLAN HAS BEEN DEVELOPED TO EVALUATE THE FEASIBILITY OF PERFORMING THE PLANNED WORK. THE CONTRACTOR SHALL PREPARE HIS OWN STAGING PLAN BASED ON HIS PLANNED EQUIPMENT, MATERIALS, AND PROCEDURES FOR PERFORMING THE WORK.

PHASE I:

1. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE, DEWATERING AREA, STOCKPILING AREA AND EQUIPMENT STAGING AREA, FENCE/GATES.
2. INSTALL SESC MEASURES INCLUDING TURBIDITY CURTAIN.
3. BEGIN CLEARING AND GRUBBING.
4. CONSTRUCT HAUL ROADS.
5. BEGIN EXCAVATION/DEWATERING/REMOVAL OF EXCAVATED MATERIAL AT SOUTH END OF SITE. ALL REMOVED MATERIAL SHALL BE DISPOSED OF OFF SITE AFTER ADEQUATE DEWATERING IS COMPLETE.
6. LEAVE EXISTING HIGHER ELEVATIONS LOCATED BETWEEN THE PROPOSED STOCKPILE/DEWATERING AREA AND OLD PLACE CREEK TO SERVE AS AN ADDITIONAL SEDIMENTATION AND FILTRATION BARRIER (BERM).
7. EXCAVATE/DEWATER/REMOVE MATERIAL FROM NORTH TO SOUTH. ALL REMOVED MATERIAL SHALL BE DISPOSED OF OFF SITE.

PHASE II:

1. EXCAVATE/DEWATER/REMOVE WATERWARD OF ALL ROADS TO LIMITS OF WORK (APPROXIMATELY ELEVATION 4.0 TO 2.0). MAINTAIN HAUL ROAD AS DICTATED BY SOIL CONDITIONS.
2. ACHIEVE SUB-GRADE AS SHOWN ON SHEET 10, SECTION B-B.

PHASE III

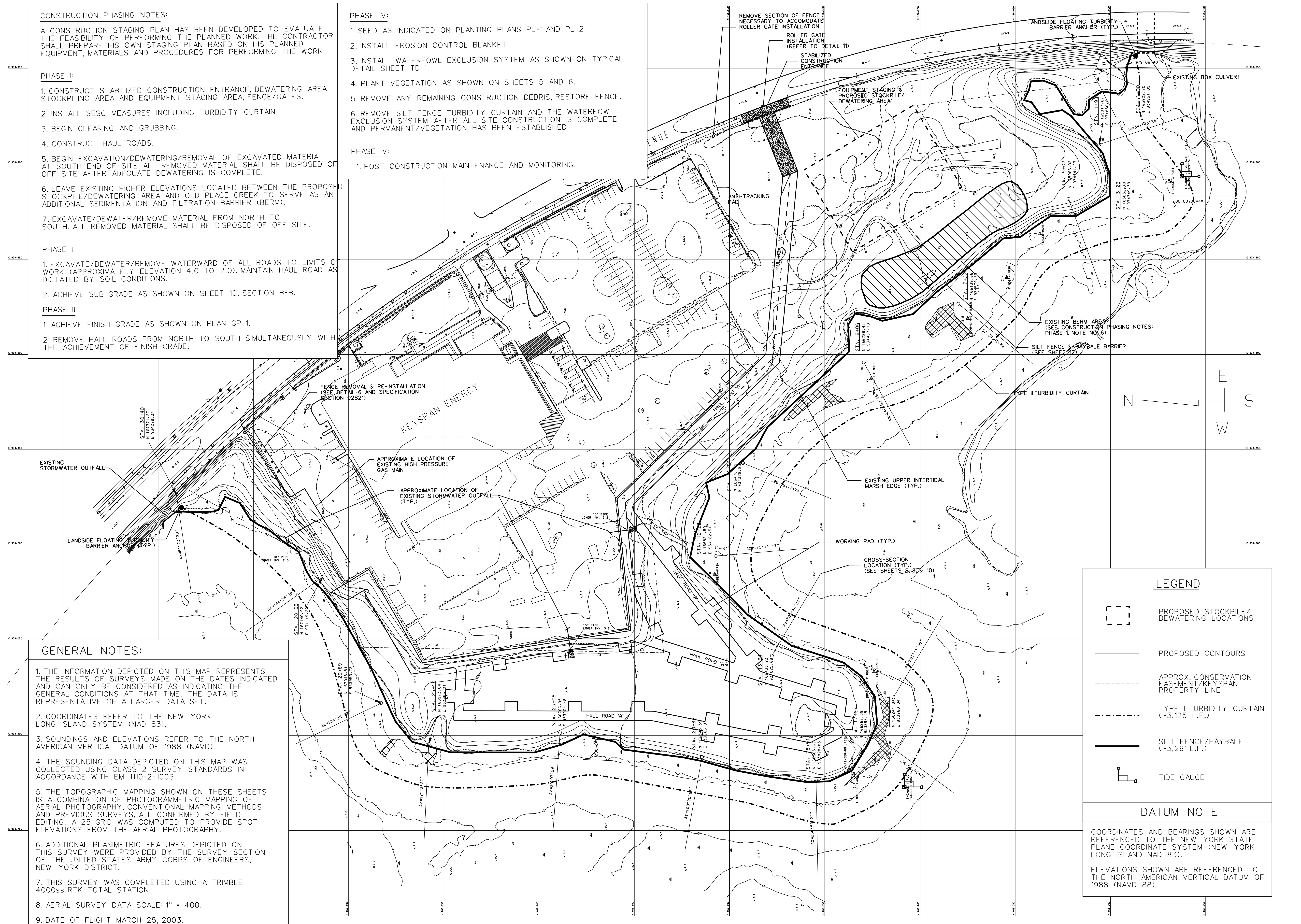
1. ACHIEVE FINISH GRADE AS SHOWN ON PLAN GP-1.
2. REMOVE HALL ROADS FROM NORTH TO SOUTH SIMULTANEOUSLY WITH THE ACHIEVEMENT OF FINISH GRADE.

PHASE IV:

1. SEED AS INDICATED ON PLANTING PLANS PL-1 AND PL-2.
2. INSTALL EROSION CONTROL BLANKET.
3. INSTALL WATERFOWL EXCLUSION SYSTEM AS SHOWN ON TYPICAL DETAIL SHEET TD-1.
4. PLANT VEGETATION AS SHOWN ON SHEETS 5 AND 6.
5. REMOVE ANY REMAINING CONSTRUCTION DEBRIS, RESTORE FENCE.
6. REMOVE SILT FENCE TURBIDITY CURTAIN AND THE WATERFOWL EXCLUSION SYSTEM AFTER ALL SITE CONSTRUCTION IS COMPLETE AND PERMANENT/VEGETATION HAS BEEN ESTABLISHED.

PHASE IV:

1. POST CONSTRUCTION MAINTENANCE AND MONITORING.



LEGEND

(dashed box)	PROPOSED STOCKPILE/ DEWATERING LOCATIONS
(thin line)	PROPOSED CONTOURS
(dash-dot line)	APPROX. CONSERVATION EASEMENT/KEYSPAN PROPERTY LINE
(dash-dot-dot line)	TYPE II TURBIDITY CURTAIN (~3,125 L.F.)
(heavy line)	SILT FENCE/HAYBALE (~3,291 L.F.)
(symbol)	TIDE GAUGE

DATUM NOTE

COORDINATES AND BEARINGS SHOWN ARE REFERENCED TO THE NEW YORK STATE PLANE COORDINATE SYSTEM (NEW YORK LONG ISLAND NAD 83).

ELEVATIONS SHOWN ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

GENERAL NOTES:

1. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF SURVEYS MADE ON THE DATES INDICATED AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS AT THAT TIME. THE DATA IS REPRESENTATIVE OF A LARGER DATA SET.
2. COORDINATES REFER TO THE NEW YORK LONG ISLAND SYSTEM (NAD 83).
3. SOUNDINGS AND ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD).
4. THE SOUNDING DATA DEPICTED ON THIS MAP WAS COLLECTED USING CLASS 2 SURVEY STANDARDS IN ACCORDANCE WITH EM 1110-2-1003.
5. THE TOPOGRAPHIC MAPPING SHOWN ON THESE SHEETS IS A COMBINATION OF PHOTOGRAMMETRIC MAPPING OF AERIAL PHOTOGRAPHY, CONVENTIONAL MAPPING METHODS AND PREVIOUS SURVEYS, ALL CONFIRMED BY FIELD EDITING. A 25' GRID WAS COMPUTED TO PROVIDE SPOT ELEVATIONS FROM THE AERIAL PHOTOGRAPHY.
6. ADDITIONAL PLANIMETRIC FEATURES DEPICTED ON THIS SURVEY WERE PROVIDED BY THE SURVEY SECTION OF THE UNITED STATES ARMY CORPS OF ENGINEERS, NEW YORK DISTRICT.
7. THIS SURVEY WAS COMPLETED USING A TRIMBLE 4000ssiRTK TOTAL STATION.
8. AERIAL SURVEY DATA SCALE: 1" = 400.
9. DATE OF FLIGHT: MARCH 25, 2003.
10. ADDITIONAL MAPPINY & BATHYMETRY COMPLETED MAY, 2003.
11. CONTOUR INTERVAL IS ONE-FOOT.

SCALE: 1" = 60'

60 0 60 120 180

US Army Corps of Engineers
New York District

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER

Designed by: BB | Date: April 2005
Dwn by: SH | Ckd by: BC

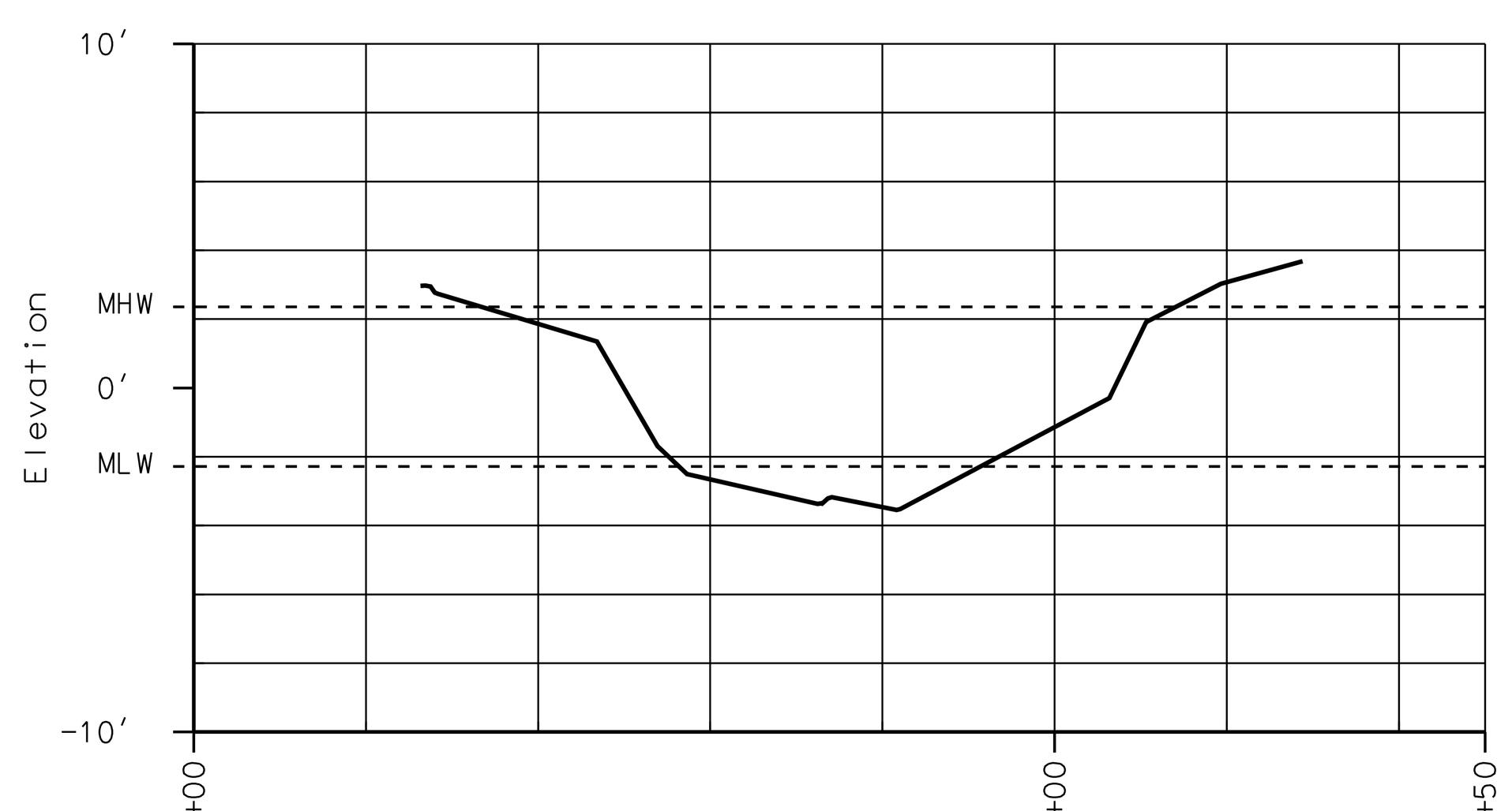
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION
CONSTRUCTION PHASING PLAN
STATEN ISLAND
NEW YORK

Sheet reference number: 7

EXISTING CROSS SECTIONS OF OLD PLACE CREEK

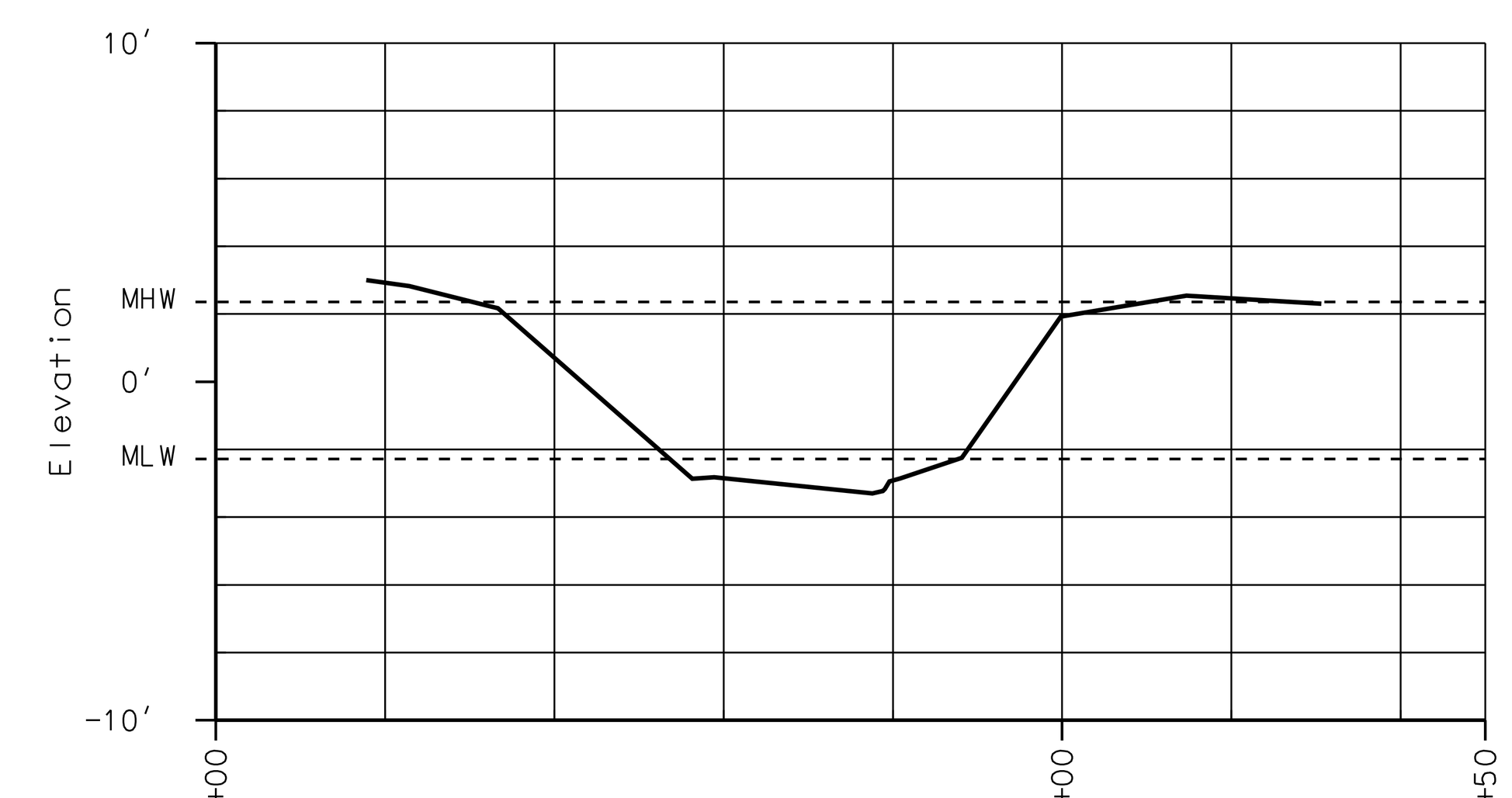
Horizontal Scale = 1:20
Vertical Scale = 1:5



Station 1+00

Station 1+00

Horizontal Scale = 1:20
Vertical Scale = 1:5



Station 1+98

Station 1+98

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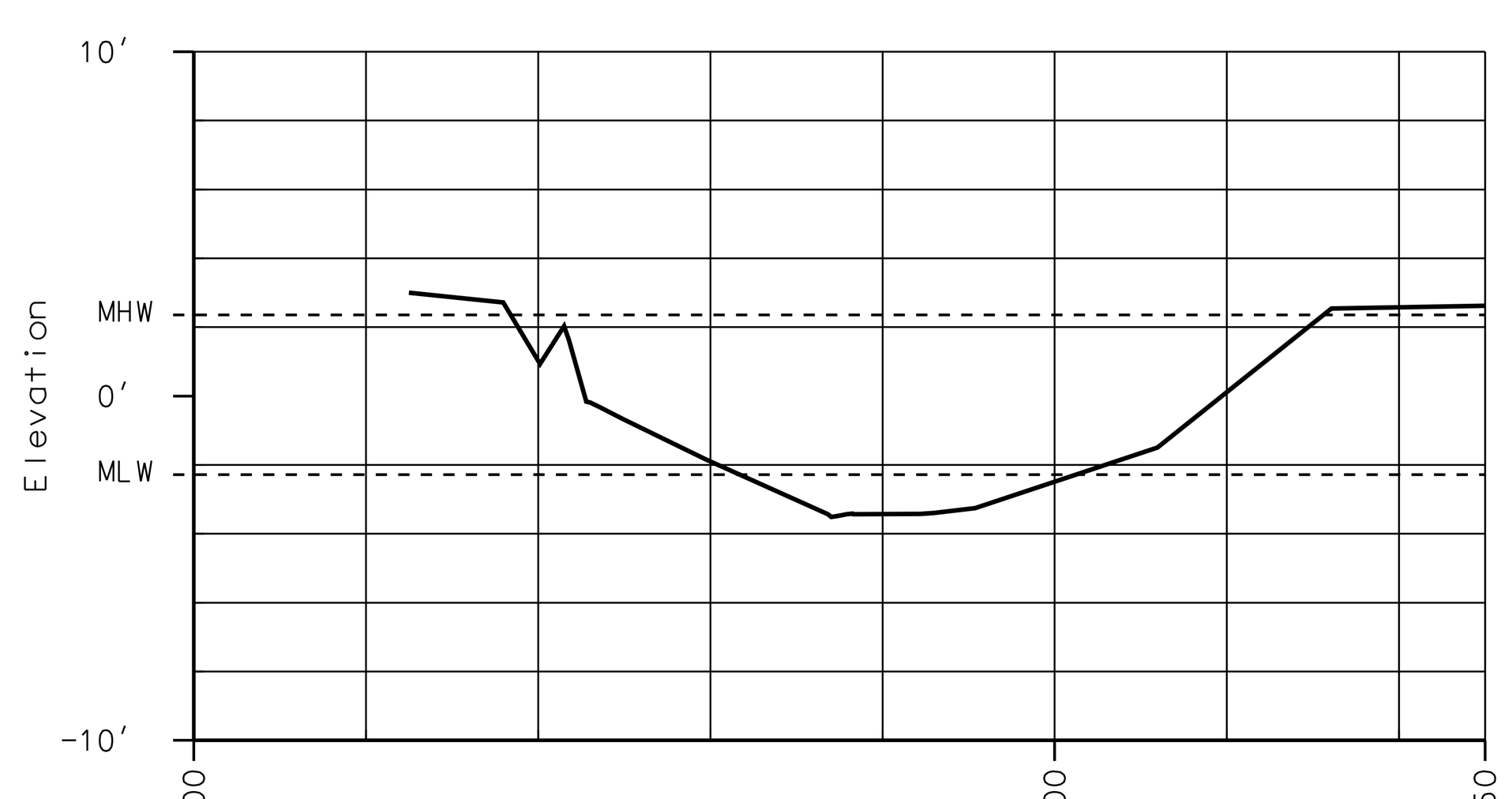
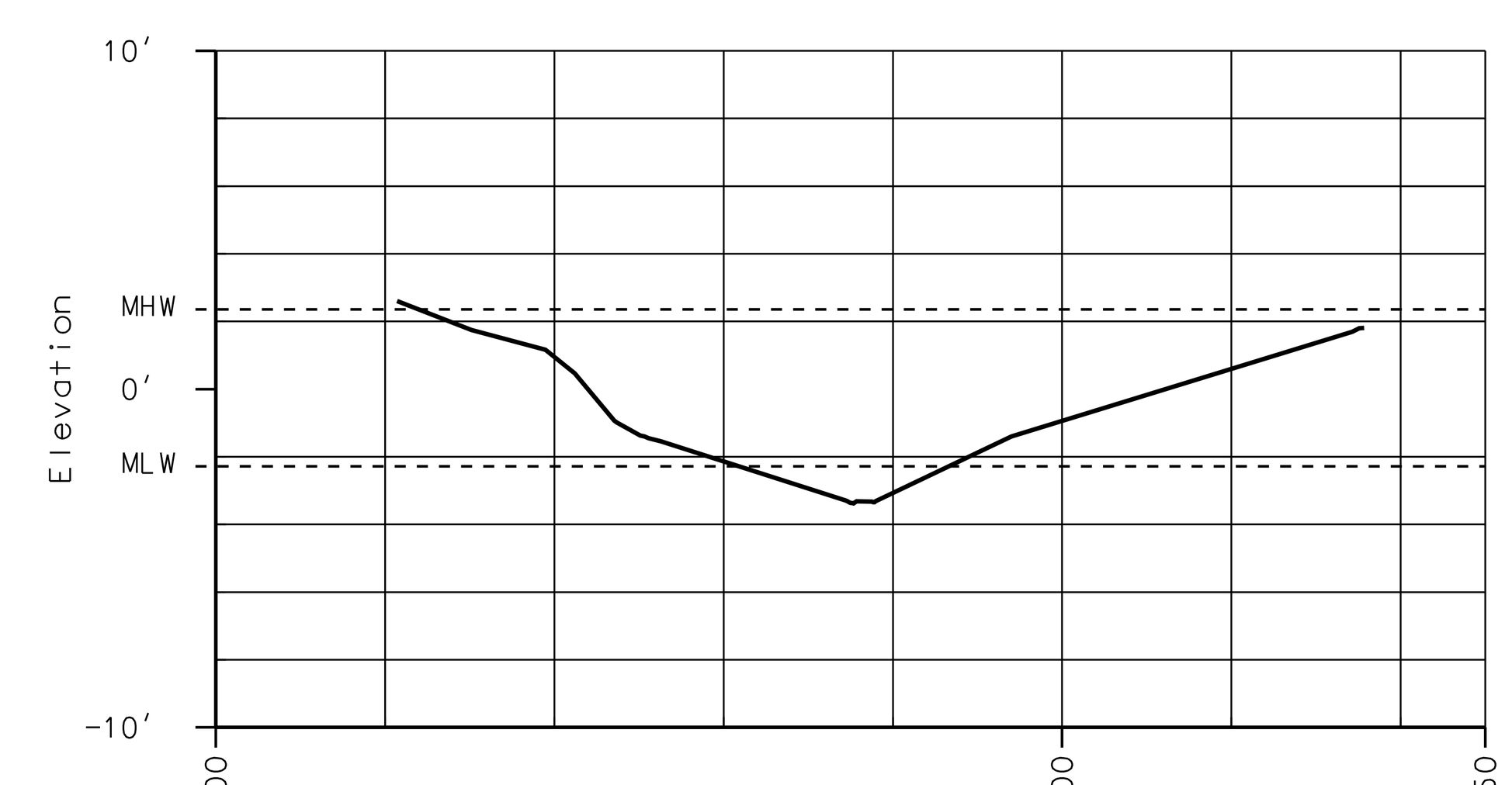
Vertical Scale = 1:5



Station 3+23

Station 3+23

Horizontal Scale = 1:20
Vertical Scale = 1:5



Station 5+02

Station 5+02

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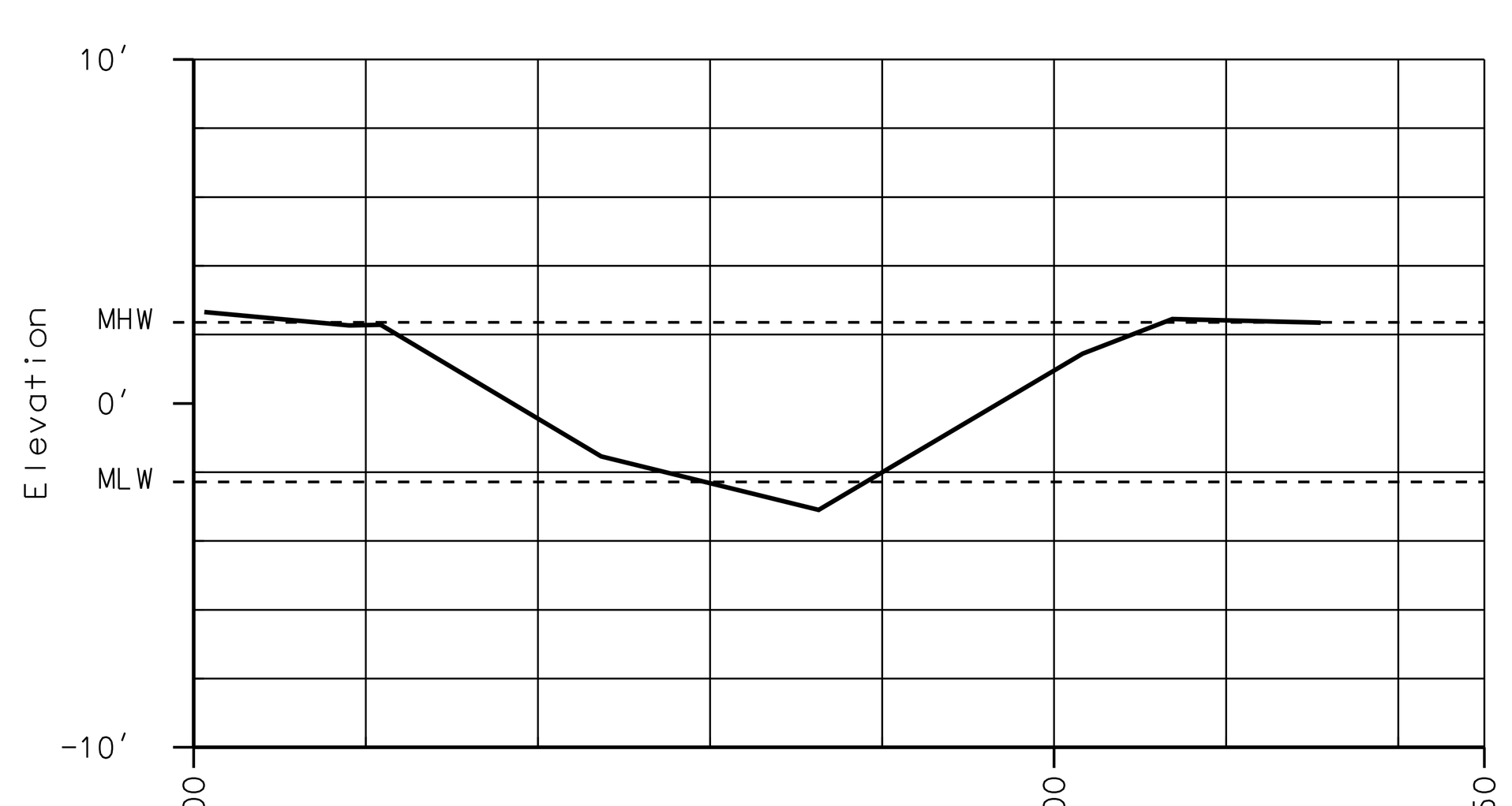
Vertical Scale = 1:5



Station 7+02

Station 7+02

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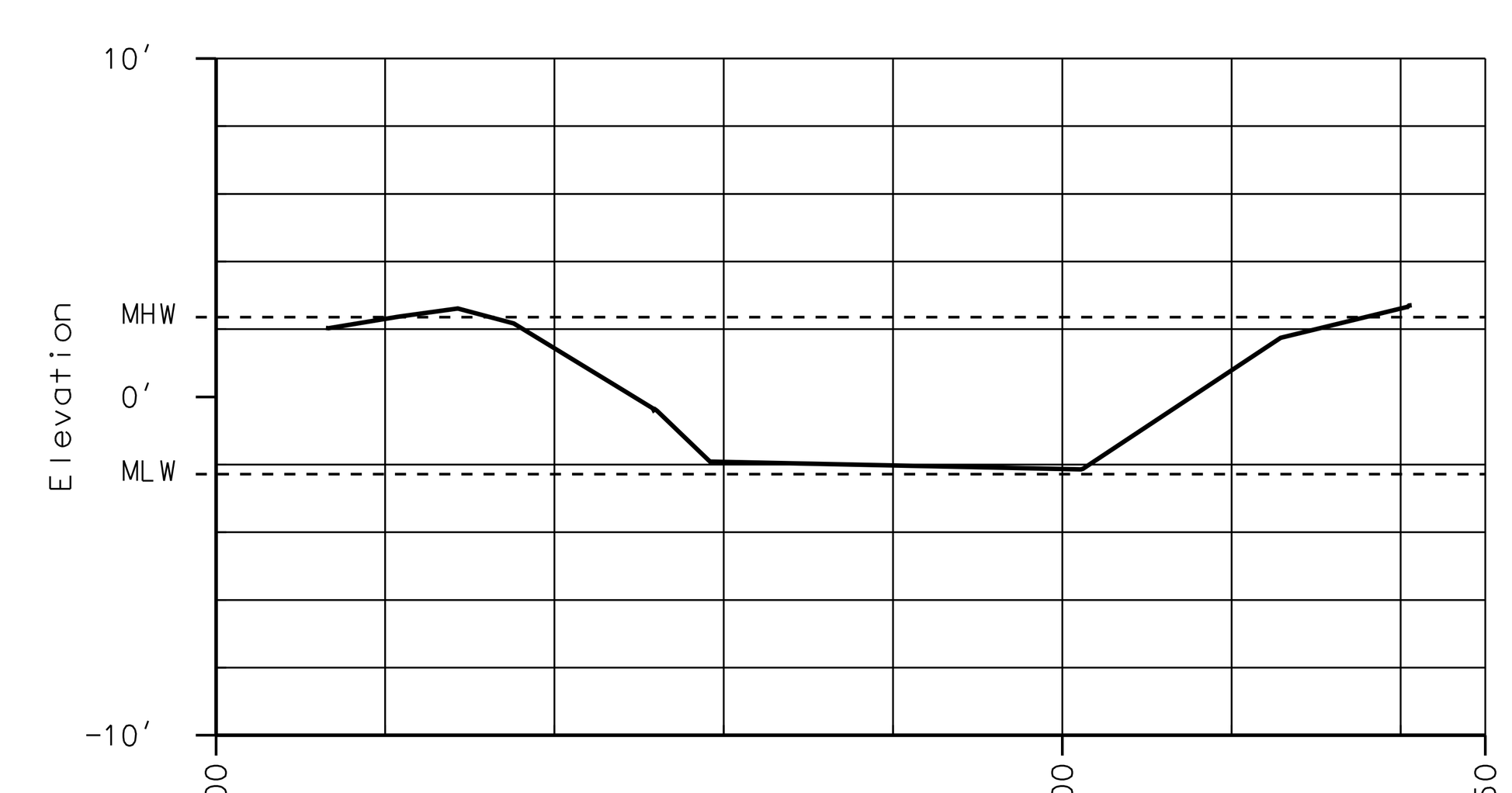
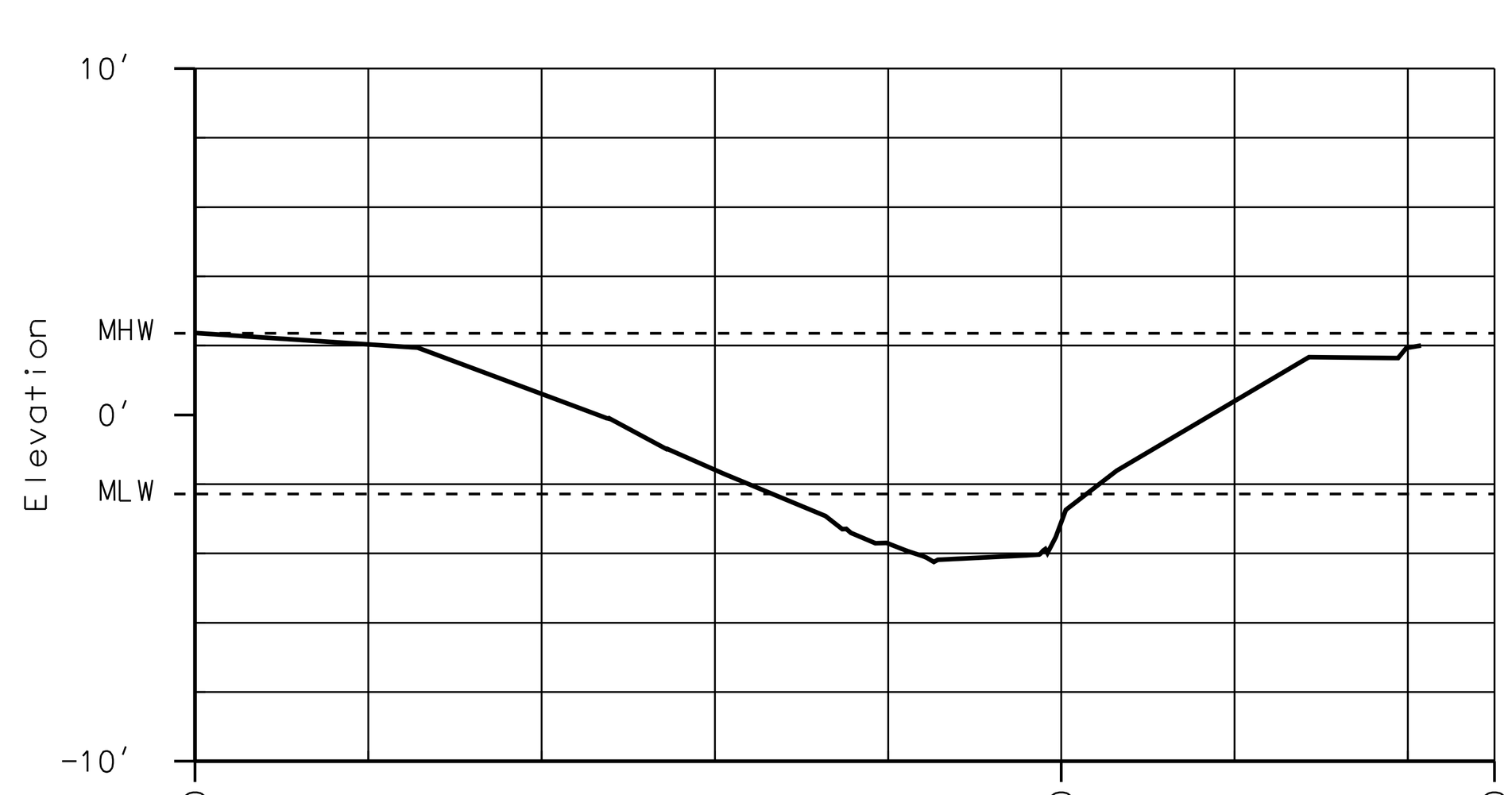
Vertical Scale = 1:5



Station 9+06

Station 9+06

Horizontal Scale = 1:20
Vertical Scale = 1:5



Station 11+04

Station 11+04

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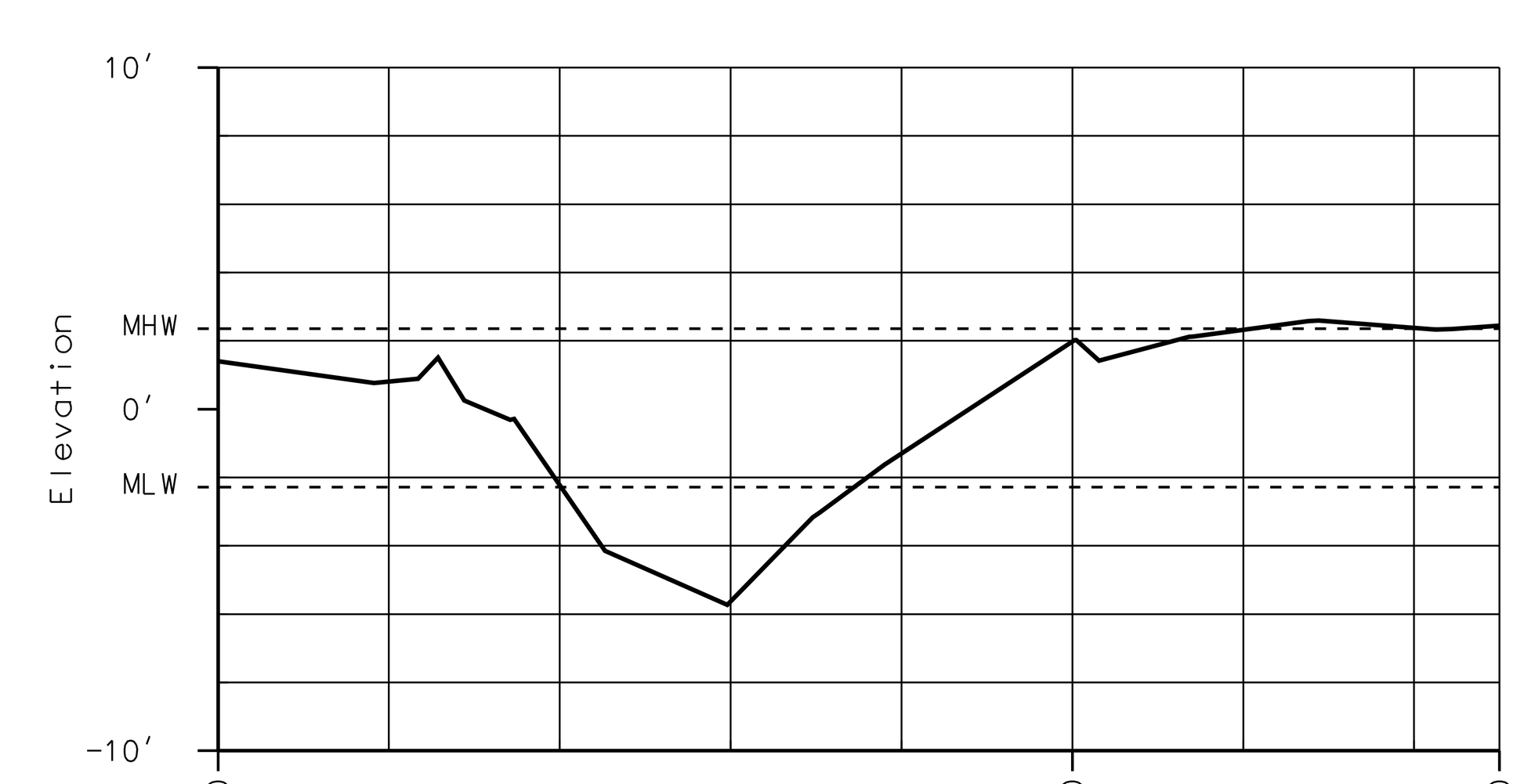
Vertical Scale = 1:5



Station 12+22

Station 12+22

US Army Corps of Engineers
New York District

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER NO. 72903

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

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Reviewed by:		Drawing code:	

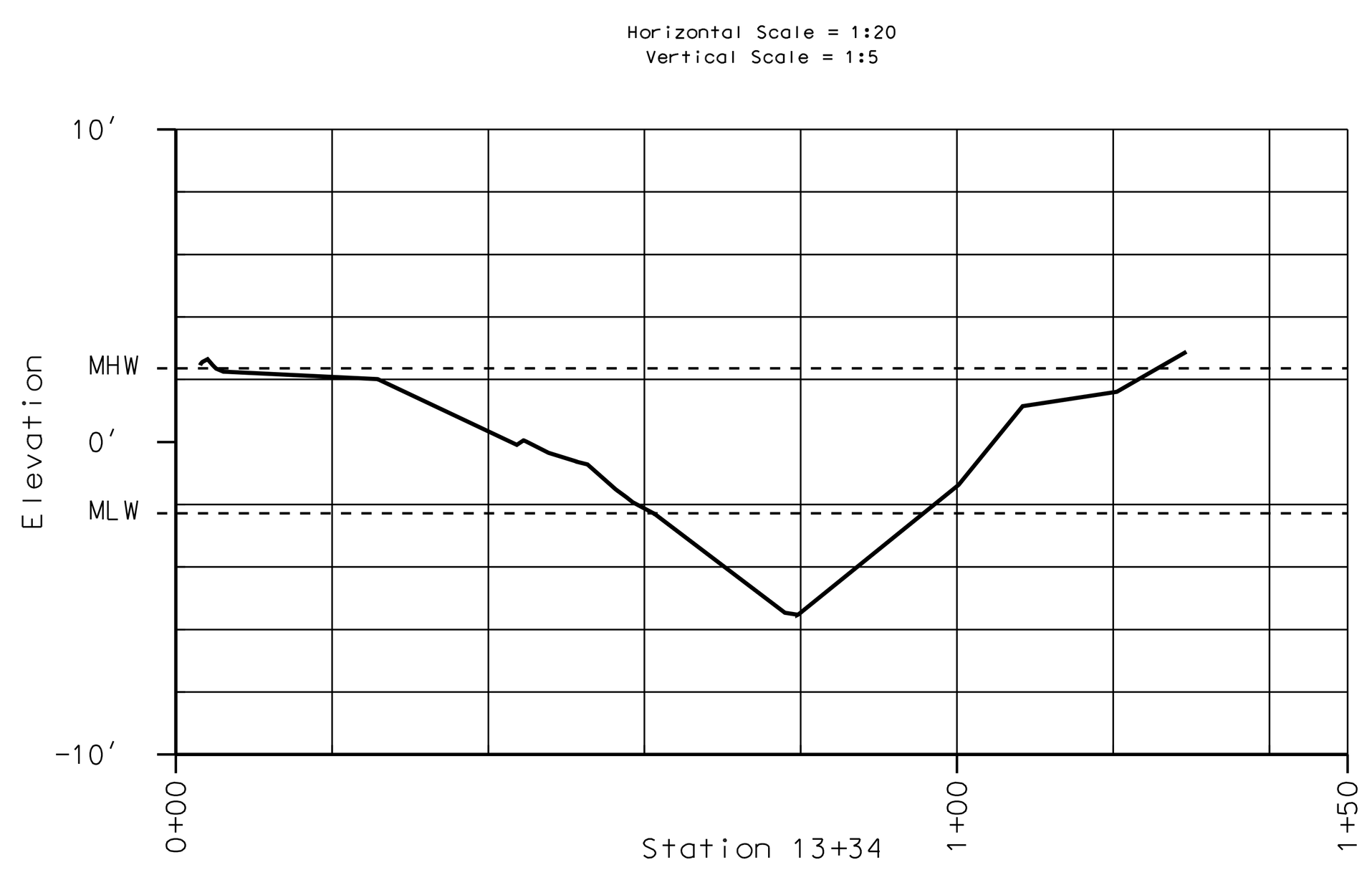
BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION

CROSS SECTIONS 1

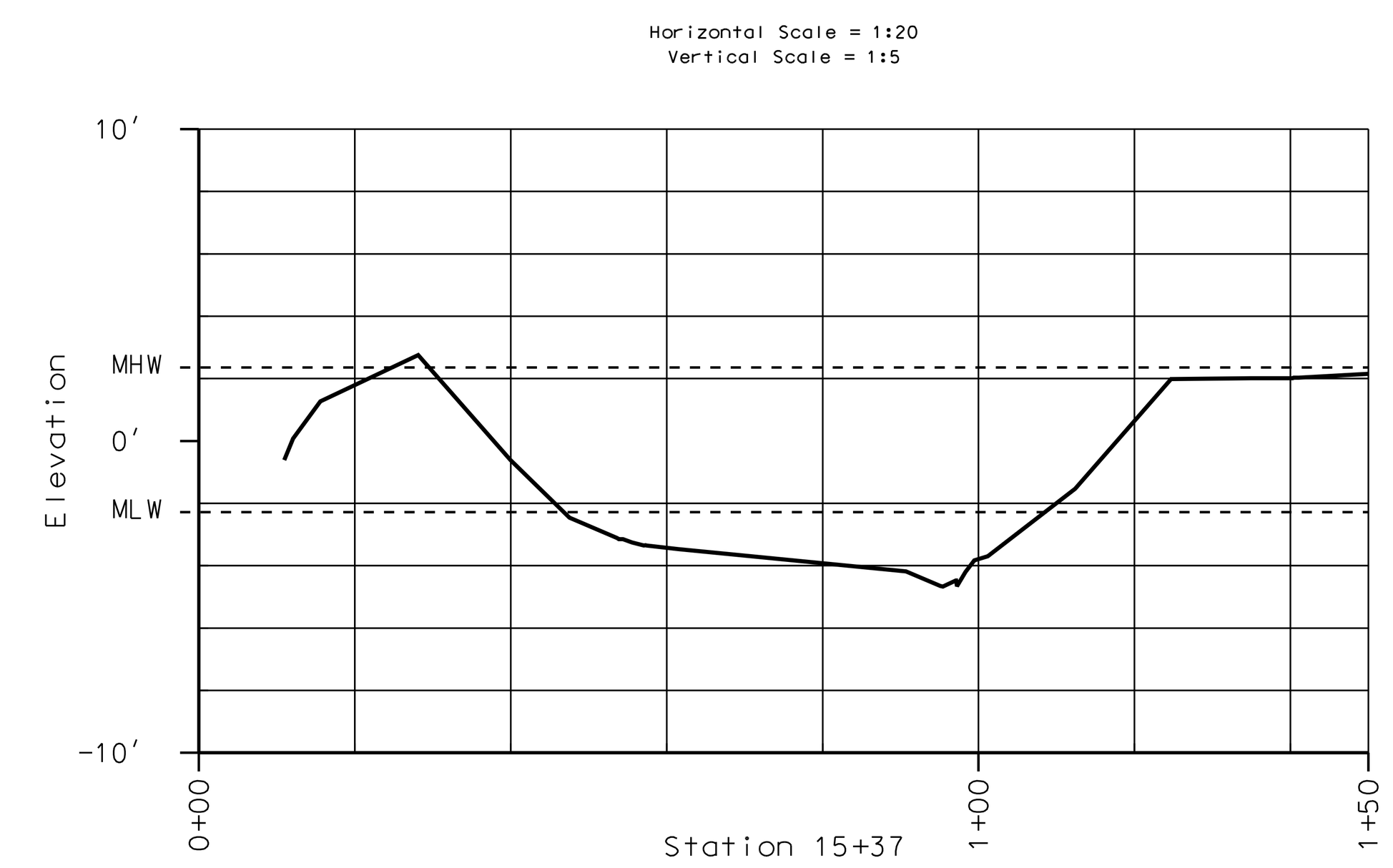
STATEN ISLAND
NEW YORK

Sheet reference number:
8

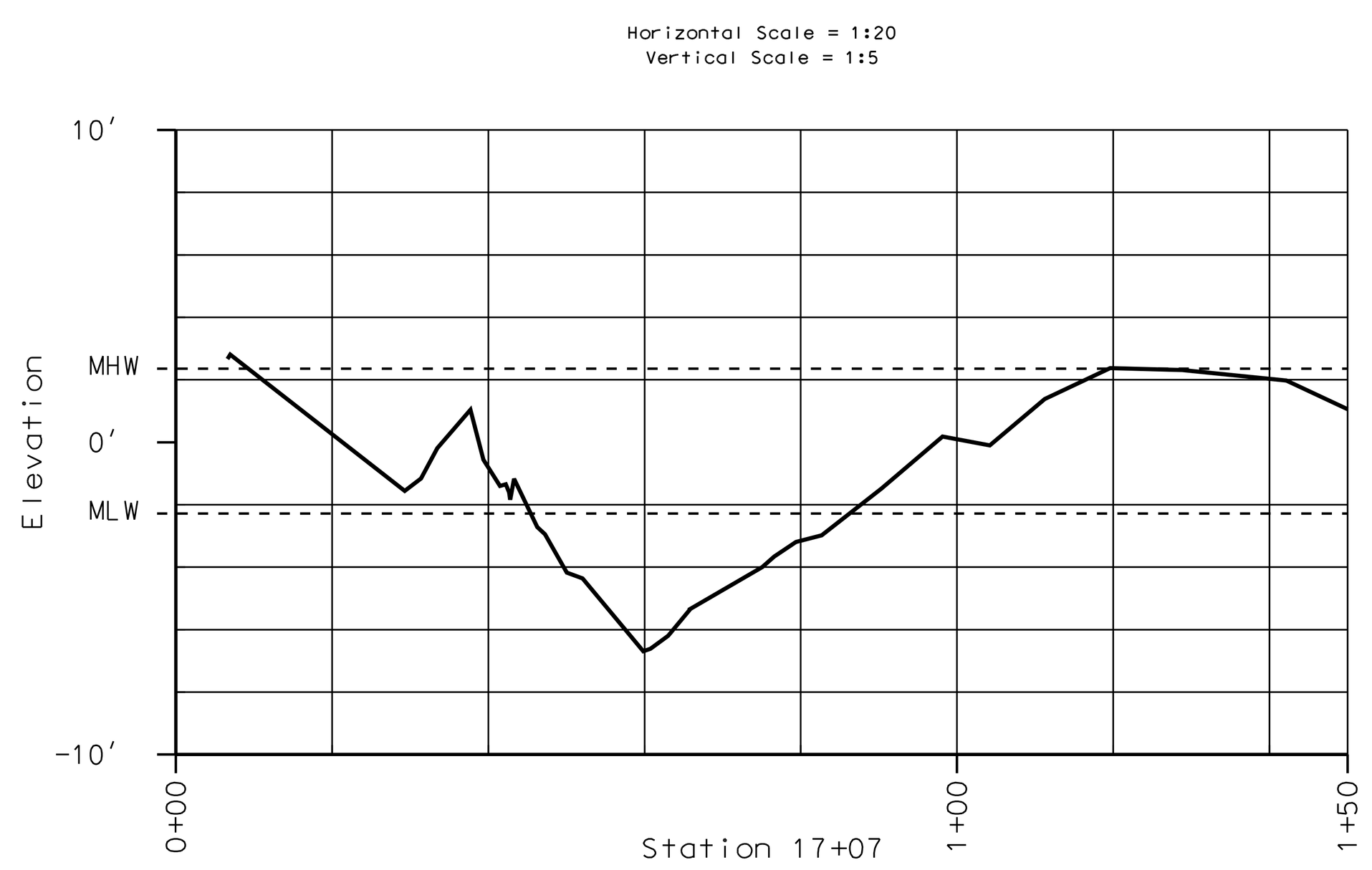
EXISTING CROSS SECTIONS OF OLD PLACE CREEK



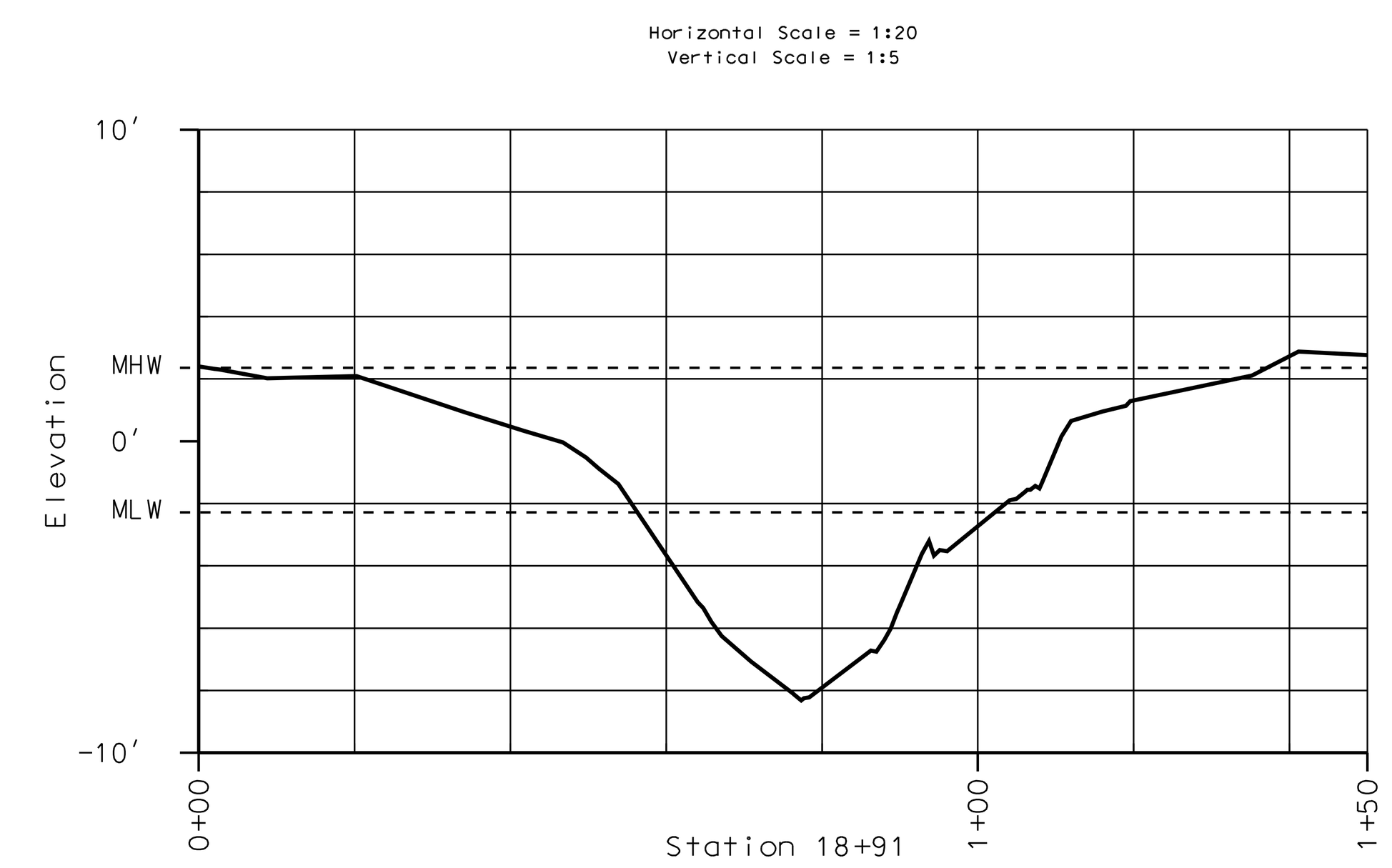
Station 13+34



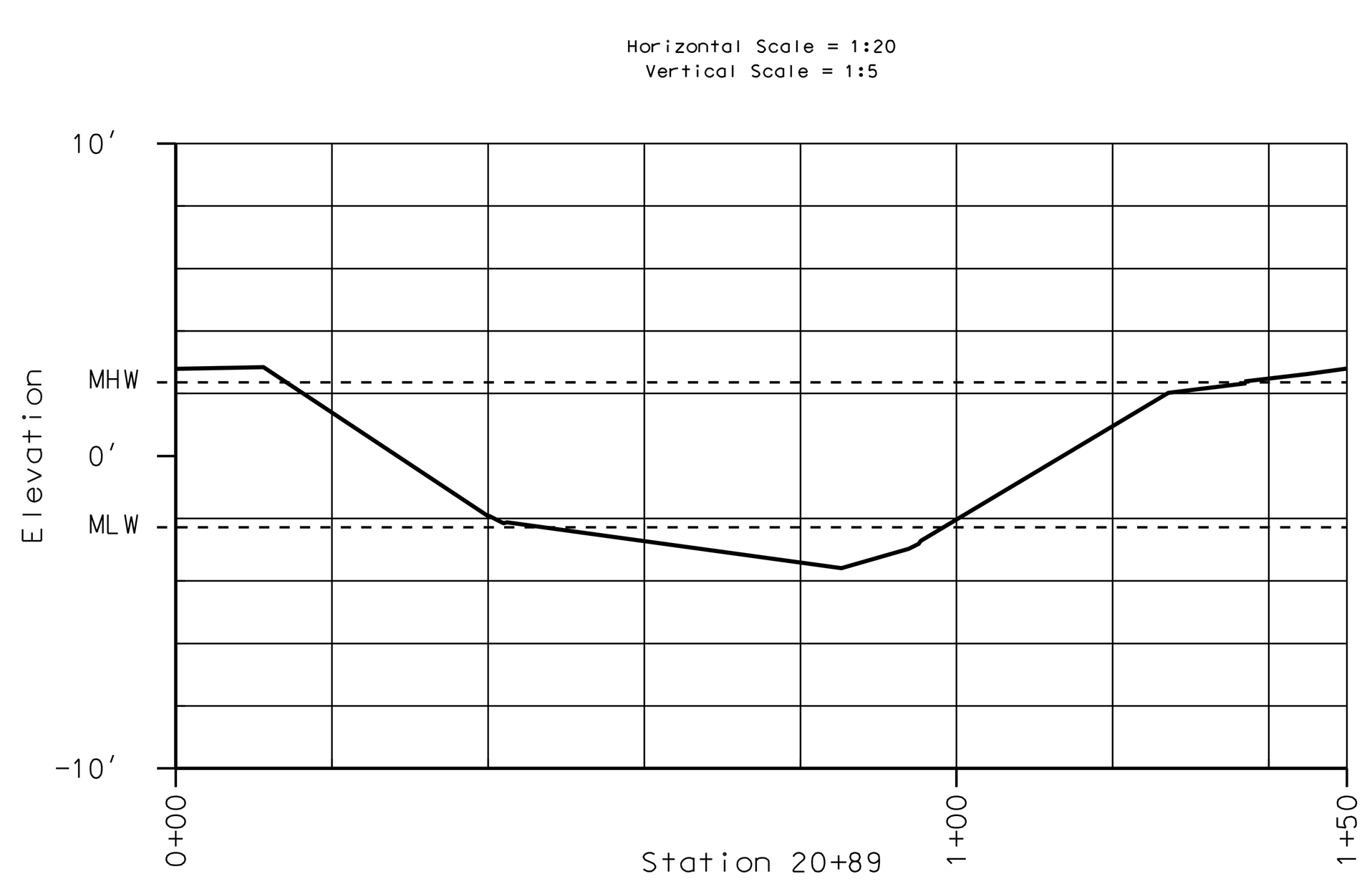
Station 15+37



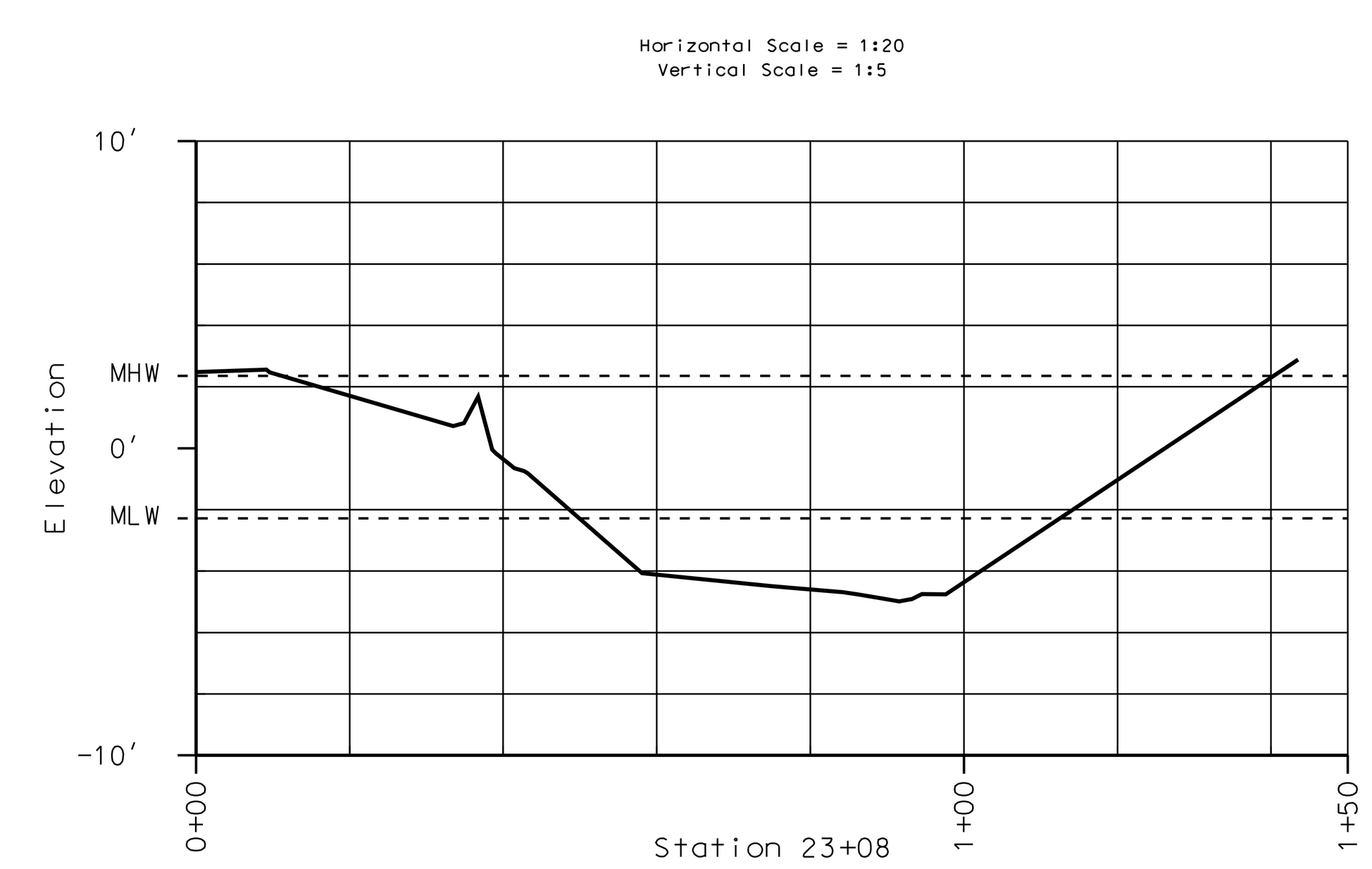
Station 17+07



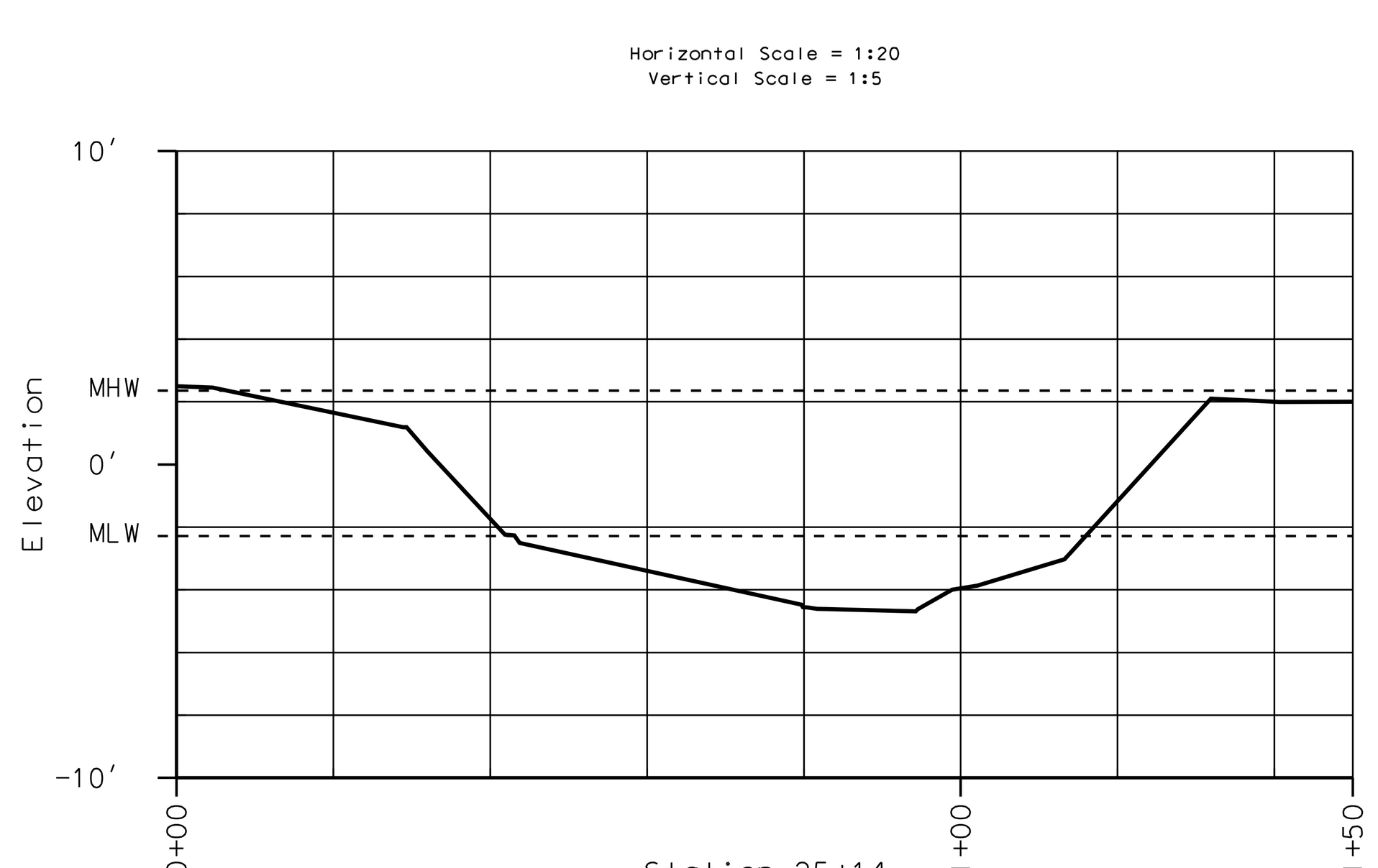
Station 18+91



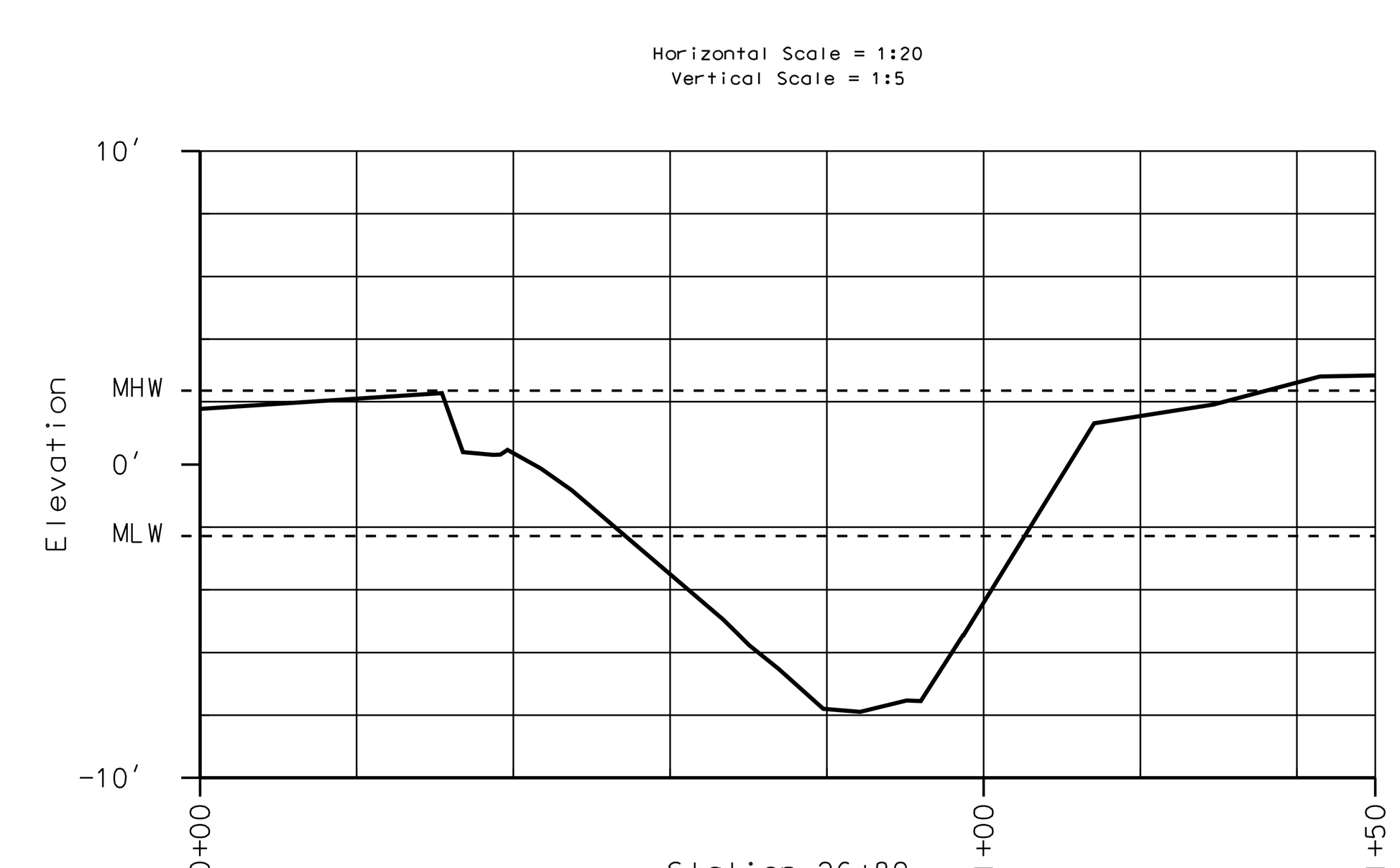
Station 20+89



Station 23+08



Station 25+14



Station 26+89

US Army Corps of Engineers
New York District

Symbol	Description	Date	Appr.

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER NO. 72903

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: BB	Date: April 2005	Size:	Rev.:
Dwn by: SH	Ckd by: BC	Drawing file no.:	
Reviewed by:		Drawing code:	

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION

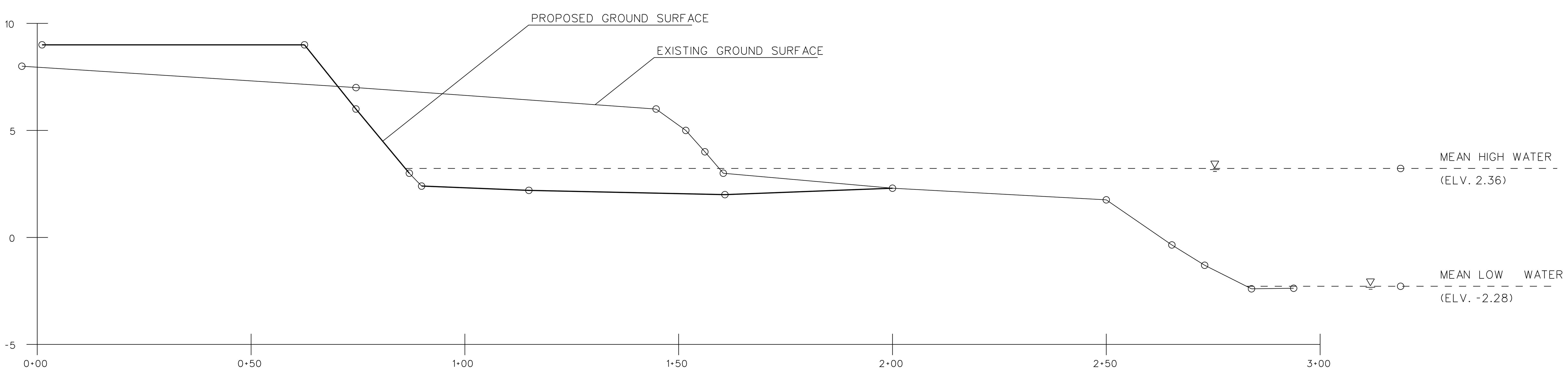
CROSS SECTIONS 2

STATEN ISLAND
NEW YORK

Sheet reference number: 9

US Army Corps of Engineers
New York District

EXISTING VS. PROPOSED CROSS SECTION (TYP.)



SECTION A-A

VERTICAL SCALE IN FEET

2.5' 0 2.5' 5'

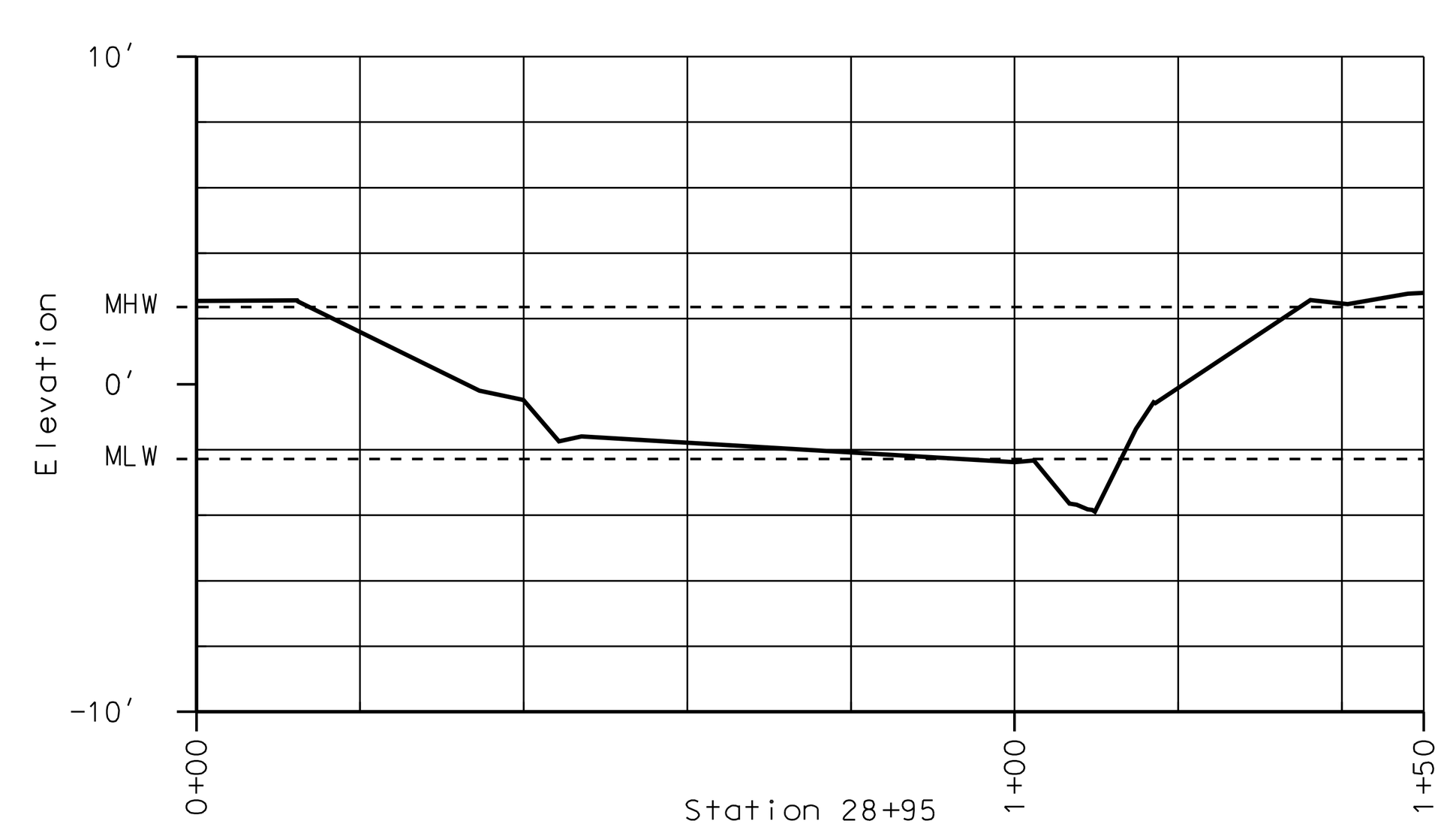
HORIZONTAL SCALE IN FEET

12.5' 0 12.5' 25'

(AS SHOWN ON SHEET 4, GRADING PLAN)

EXISTING CROSS SECTIONS OF OLD PLACE CREEK

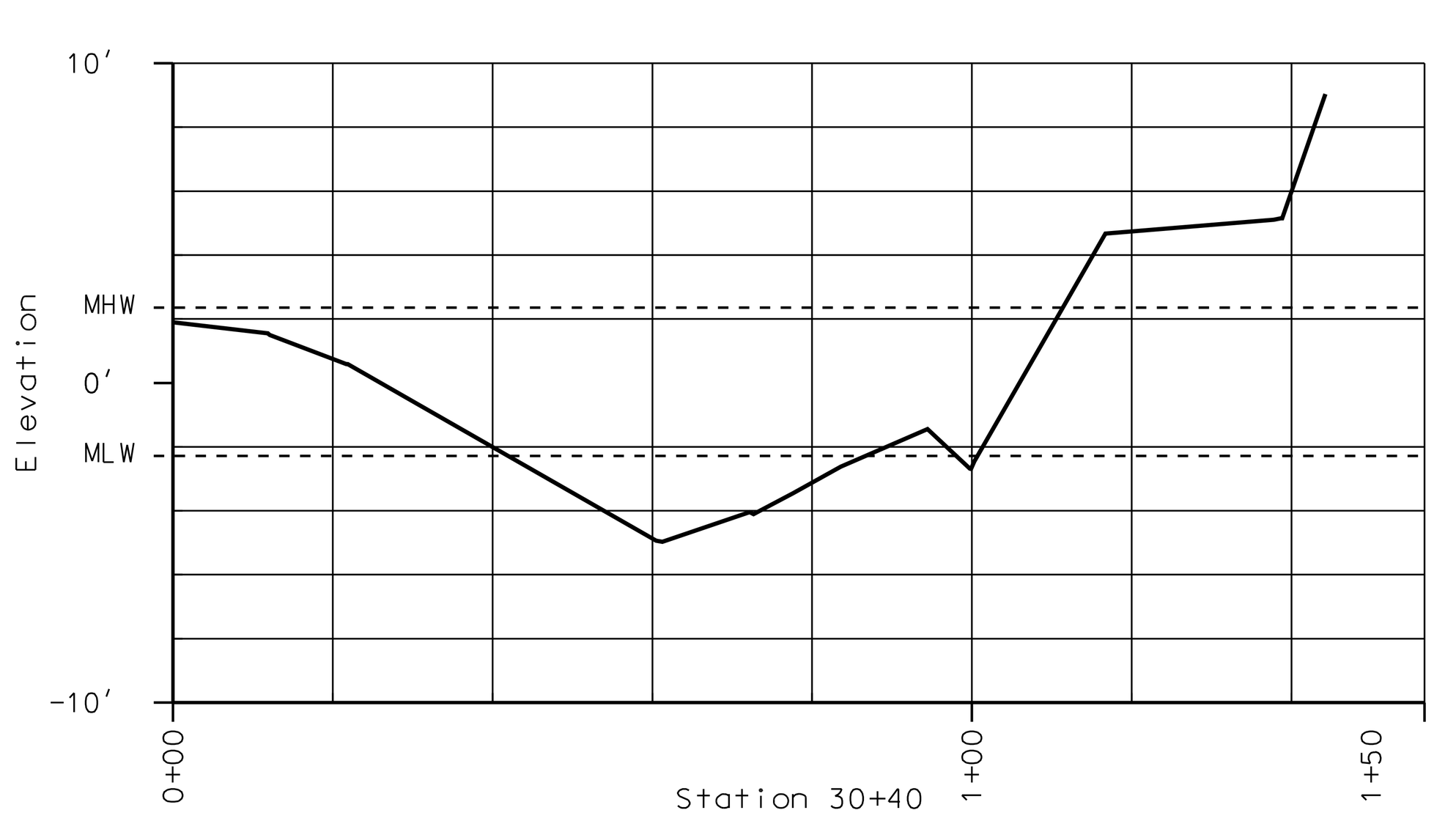
Horizontal Scale = 1:20
Vertical Scale = 1:5



Station 28+95

Station 28+95

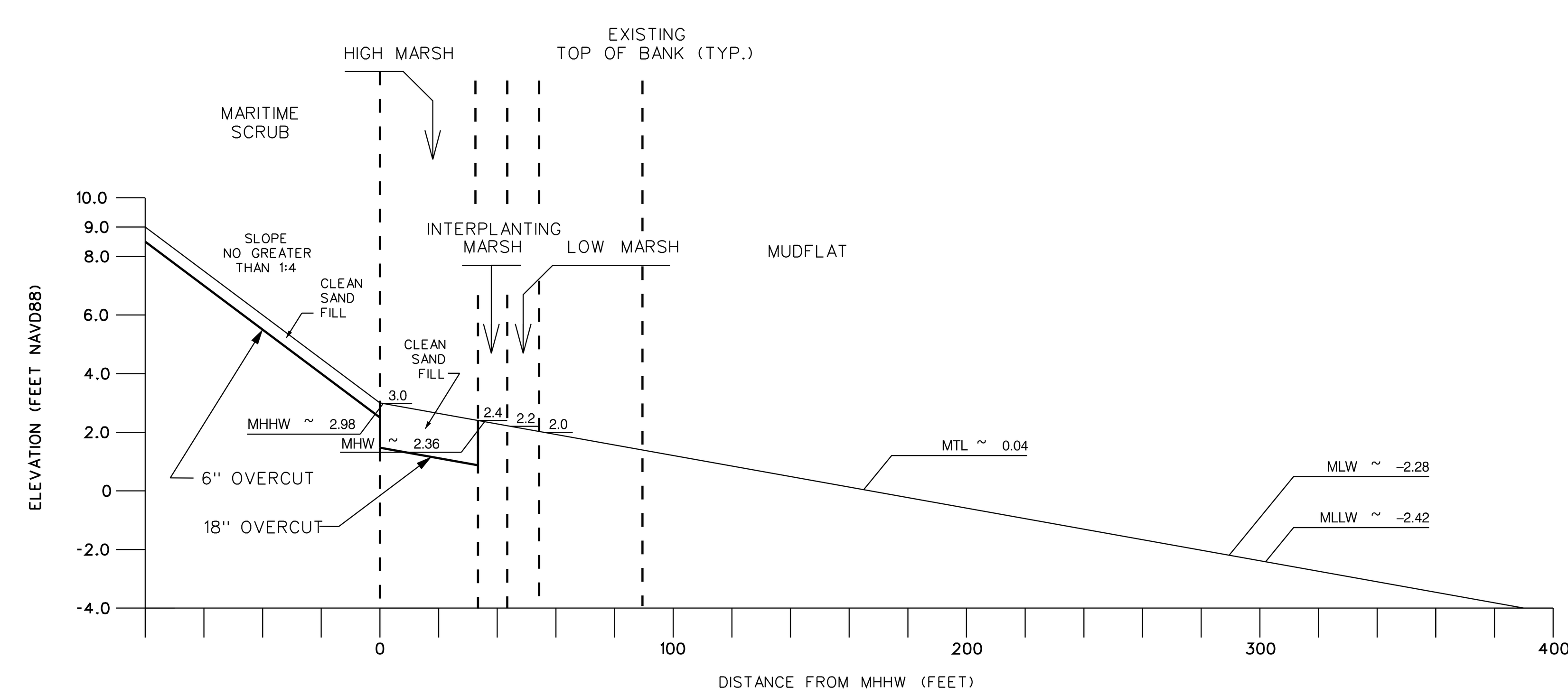
Horizontal Scale = 1:20
Vertical Scale = 1:5



Station 30+40

Station 30+40

PROPOSED CROSS SECTION (TYP.)



SECTION B-B

SCALE: NONE

(AS SHOWN ON SHEET 5, LANDSCAPE PLAN)

NOTES:

1. PROPOSED 18" OVERCUT AREA IN PROPOSED HIGH MARSH PLANTING ZONE WILL BE BACKFILLED WITH 18" OF CLEAN SAND PRIOR TO PLANTING.
2. PROPOSED 6" OVERCUT AREA IN PROPOSED MARITIME SCRUB/SHRUB PLANTING ZONE WILL BE BACKFILLED WITH 6" OF CLEAN SAND PRIOR TO PLANTING.
3. INTERTIDAL MARSH AND LOW MARSH MUST BE GRADED TO DRAIN.

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER
NO. 72903

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK	Designed by: BB	Date: April 2005	Size: Rev.:
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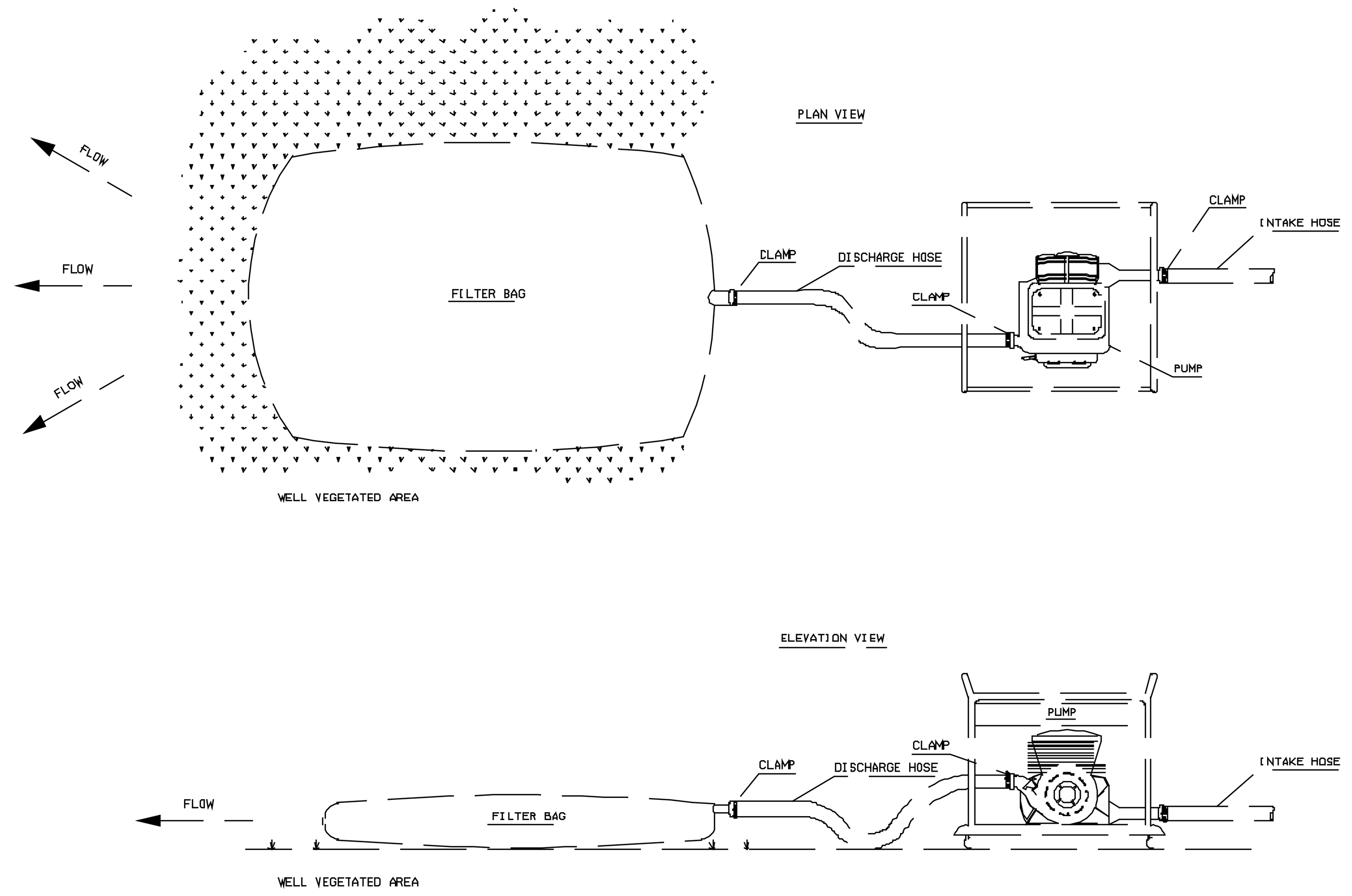
	Reviewed by:	Drawing code:	

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION

CROSS SECTIONS 3

STATEN ISLAND
NEW YORK

Sheet reference number:
10



NOTES:

1. NON-WOVEN GEOTEXTILE FILTER BAG WHICH RETAINS ALL SEDIMENT PARTICLES LARGER THAN 150 MICRONS.

2. PLACE FILTER BAGS ON STABLE OR WELL VEGETATED AREAS WHICH ARE FLATTER THAN 5% AND WHICH WILL NOT ERODE WHEN SUBJECTED TO BAG DISCHARGES.

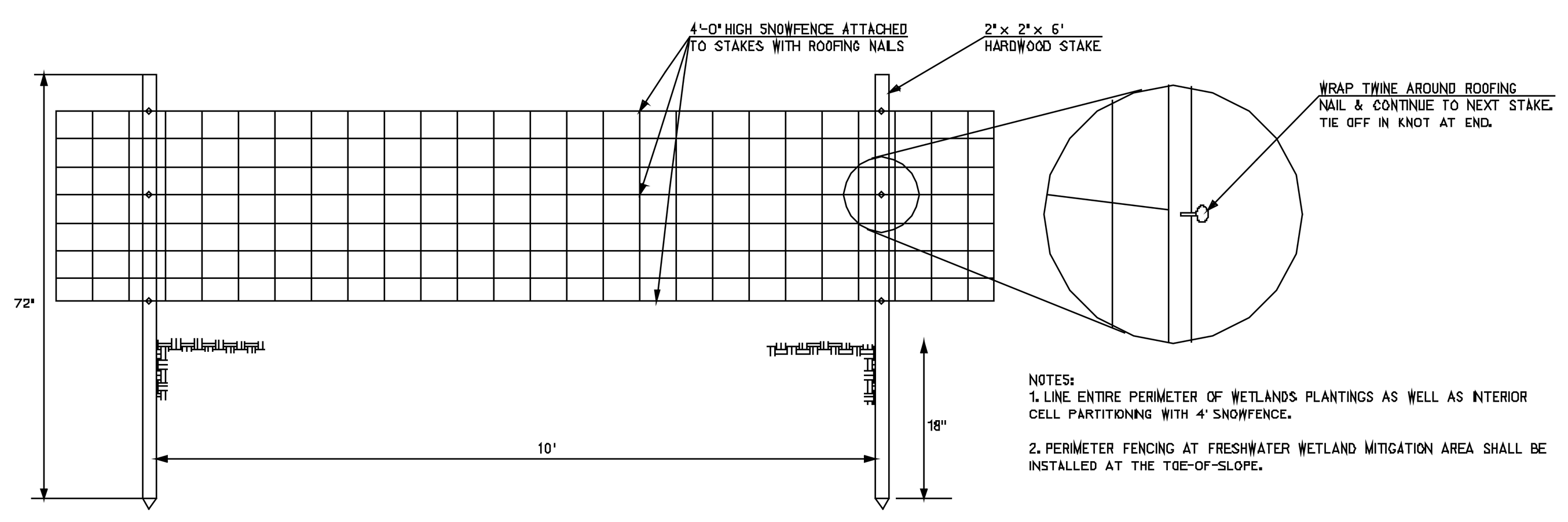
3. CLAMP PUMP DISCHARGE HOSES SECURELY TO FILTER BAG.

4. LIMIT PUMPING RATE TO 1/2 THE MANUFACTURER'S MAXIMUM PUMPING RATE.

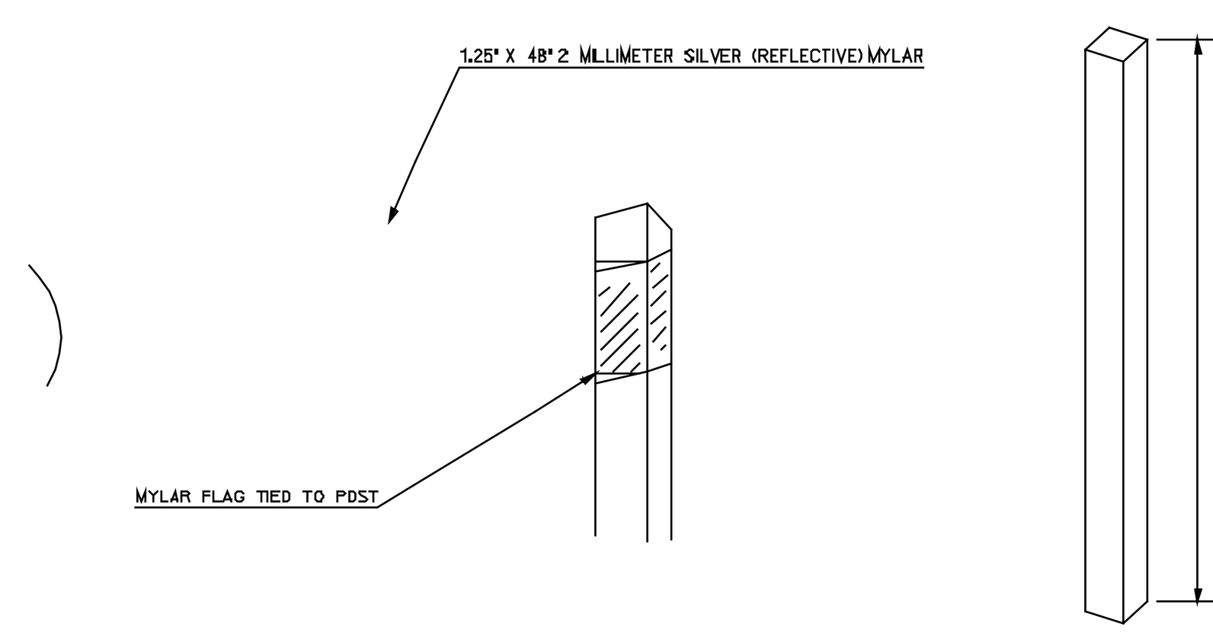
5. WHEN SEDIMENTS FILL 1/2 THE VOLUME OF A FILTER BAG, IMMEDIATELY REMOVE THAT BAG FROM SERVICE. PROPERLY DISPOSE OF SPENT BAGS WITH THEIR SEDIMENTS.

6. THE SEDIMENT FILTER BAG IS TO BE USED IN CONJUCTION WITH THE SEDIMENT TRAP (DETAIL 10). THE SEDIMENT FILTER BAG WILL BE PLACED UP-SLOPE OF THE SEDIMENT TRAP. THIS SYSTEM IS DESIGNED TO BE USED IN VARIOUS AREAS OF THE SITE ON AN AS-NEEDED BASIS TO DEWATER OPEN EXCAVATION AREAS.

DETAIL 1 SEDIMENT FILTER BAG FOR PUMPED WATER

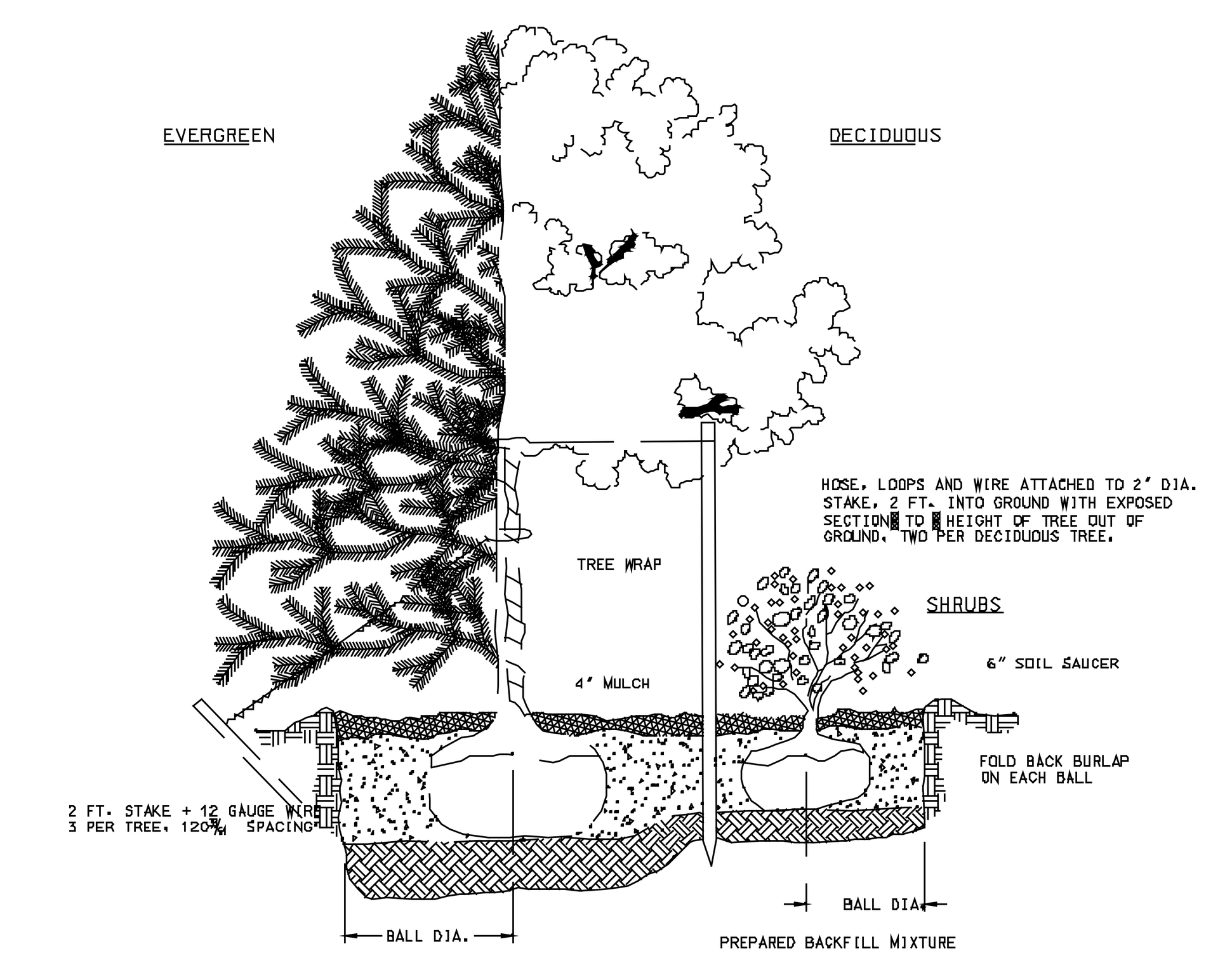


WATERFOWL EXCLUSION: PERIMETER FENCING

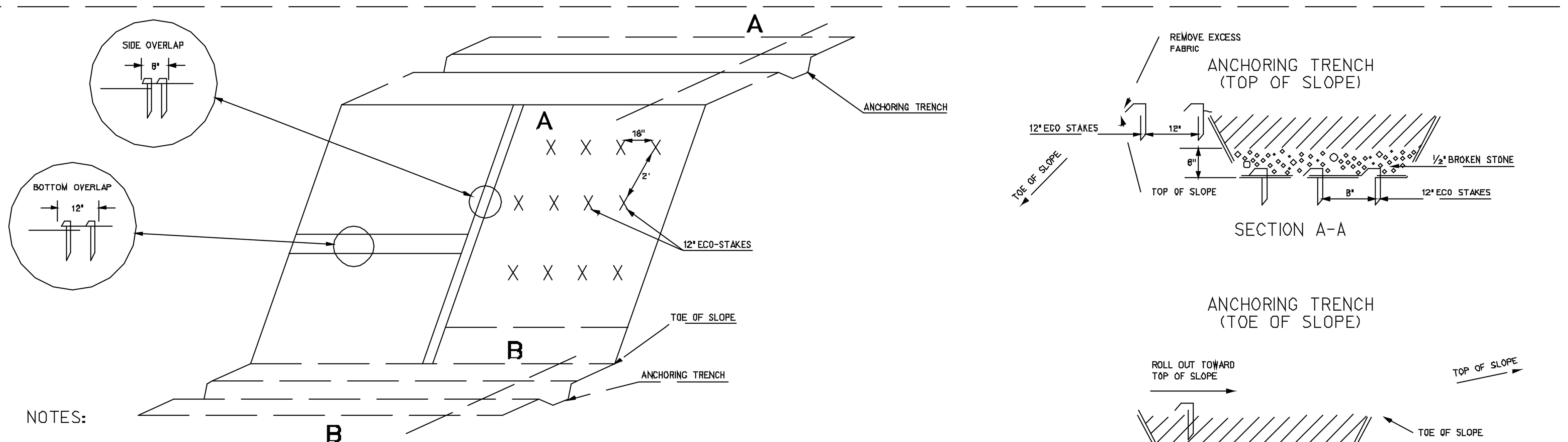


REFLECTIVE MYLAR SHALL BE 1.25" WIDE REFLECTIVE BIRDSCARE TAPE OR APPROVED EQUIVELANT. BIRDSCARE TAPE AVAILABLE FROM MODERN AGRI-PRODUCTS
410 FIRST STREET
LINDEN WA, (360) 354-8884

DETAIL 4 MYLAR FLAG & STAKE ASSEMBLY



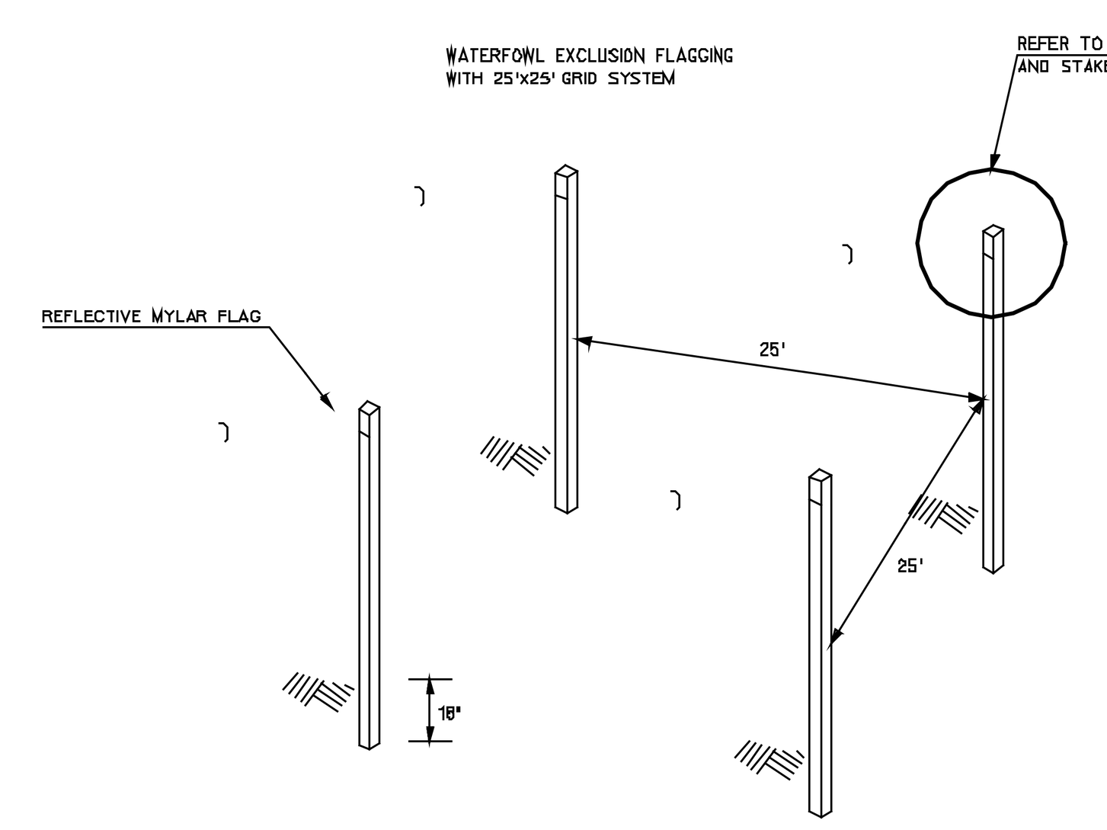
DETAIL 7 TREE PLANTING



NOTES:

1. CONTRACTOR SHALL PROVIDE ROLANKA 100% STRAW MAT (STRAW2) OR APPROVED EQUAL ON UPLAND TRANSITION SLOPES (ZONE 3) AND ROLANKA BIOND-TRM100 OR APPROVED EQUAL OVER ALL SALT MARSH RESTORATION AREAS (ZONES 1, 2 & 4).
2. CONTRACTOR SHALL ANCHOR EROSION CONTROL BLANKET WITH 12" 100% BIODEGRADABLE ECO-STAKES FROM NORTHAMERICAN GREEN OR APPROVED EQUAL.
3. PLACE BLANKET IN TOE OF SLOPE ANCHORING TRENCH BEGINNING ON UPSLOPE SIDE FIRST. STAKE BLANKET IN PLACE. STAKES TO BE PLACED ON AN 8" GRID PATTERN.
4. PLACE 1/2" BROKEN STONE ON TOP OF STAKED BLANKET WITHIN ANCHOR TRENCH TO A DEPTH OF 6"-8".
5. PLACE EXCAVATED MATERIAL ON TOP OF 1/2" BROKEN STONE BACKFILL TO FINISH GRADE.
6. ROLL BLANKET UPSLOPE AND STAKE IN PLACE IN STAGGERED ROWS 2' APART AT 1.5' INTERVALS.
7. ANCHOR FABRIC WITHIN THE TOP OF SLOPE ANCHORING TRENCH IN ACCORDANCE WITH THE FOLLOWING:
   - BEGIN AT THE DOWNSLOPE END OF THE ANCHORING TRENCH AND ROLL UP SLOPE AND ANCHOR IN PLACE.
   - BACKFILL WITH STONE AND EXCAVATED MATERIAL.
   - PROCEED TO ROLL FABRIC OUT DOWNSLOPE UNTIL THE NEXT SECTION OF FABRIC IS MET.
   - OVERLAP 12" WITH ADJACENT SECTION OF FABRIC, REMOVE EXCESS FABRIC AND STAKE IN PLACE ACCORDING TO DETAIL.

DETAIL 2 EROSION CONTROL BLANKET



NOTES:

1. INTERIOR FLAG ASSEMBLY SHALL BE INSTALLED BETWEEN LIMITS OF PERIMETER FENCING IN THE WETLAND MITIGATION AREA.

2. STAKES SHALL BE SPACED ON 25' SQUARE CENTERS. EACH STAKE SHALL BE DRIVEN A MINIMUM OF 18" INTO THE GROUND.

3. AFFIX FLAGS TO TOP OF EACH STAKE PER MYLAR FLAG & STAKE DETAIL.

4. INTERIOR CELL PARTITIONS SHALL BE CONSTRUCTED AT 25' INTERVAL WITH SNOWFENCING ALONG THE LONG AXIS AND COIR TWINE ALONG THE SHORT AXIS OF THE WETLANDS AREA.

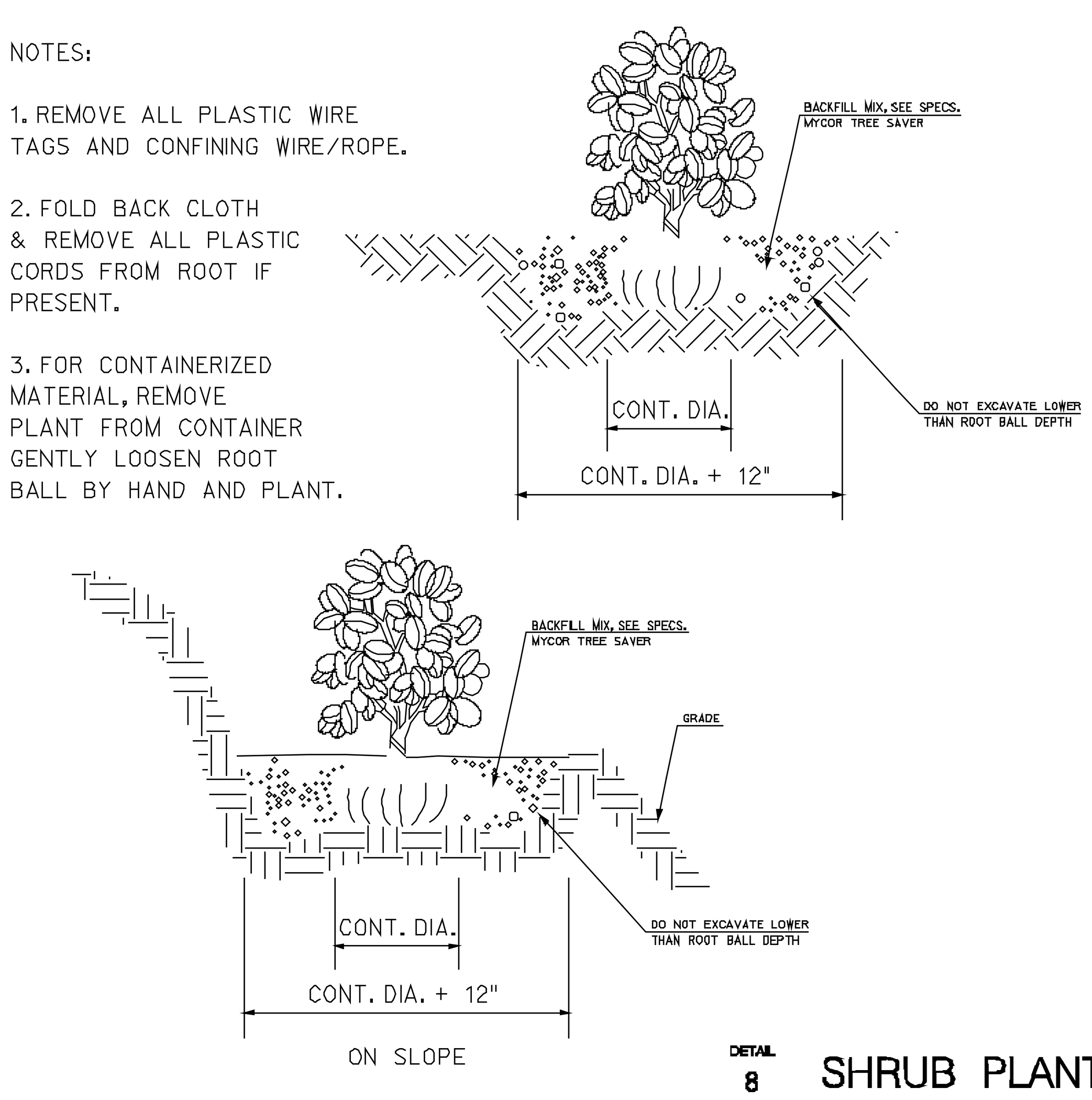
DETAIL 5 WATERFOWL EXCLUSION: INTERIOR FLAGGING

NOTES:

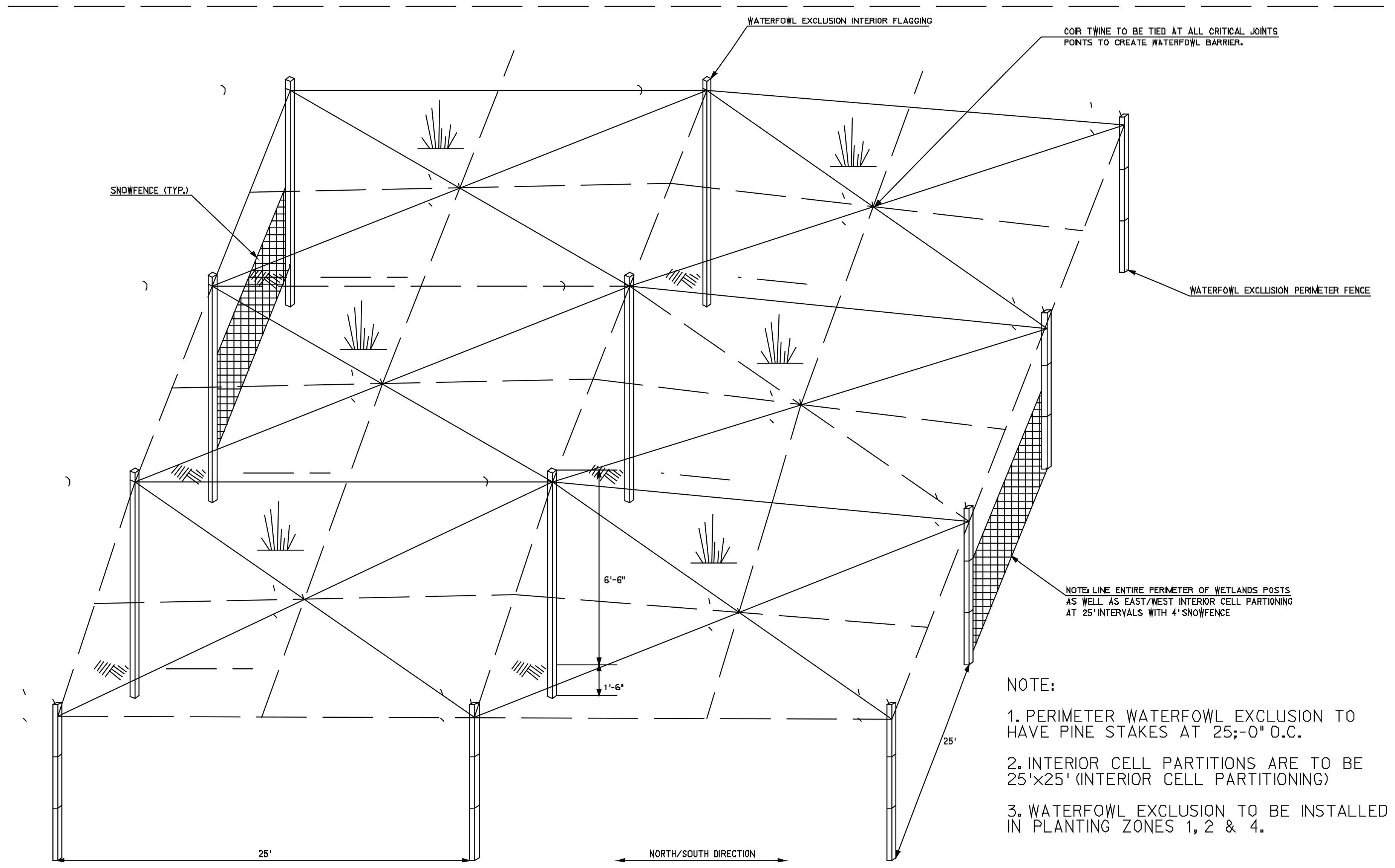
1. REMOVE ALL PLASTIC WIRE TAGS AND CONFINING WIRE/ROPE.

2. FOLD BACK CLOTH & REMOVE ALL PLASTIC CORDS FROM ROOT IF PRESENT.

3. FOR CONTAINERIZED MATERIAL, REMOVE PLANT FROM CONTAINER GENTLY LOOSEN ROOT BALL BY HAND AND PLANT.



DETAIL 8 SHRUB PLANTING



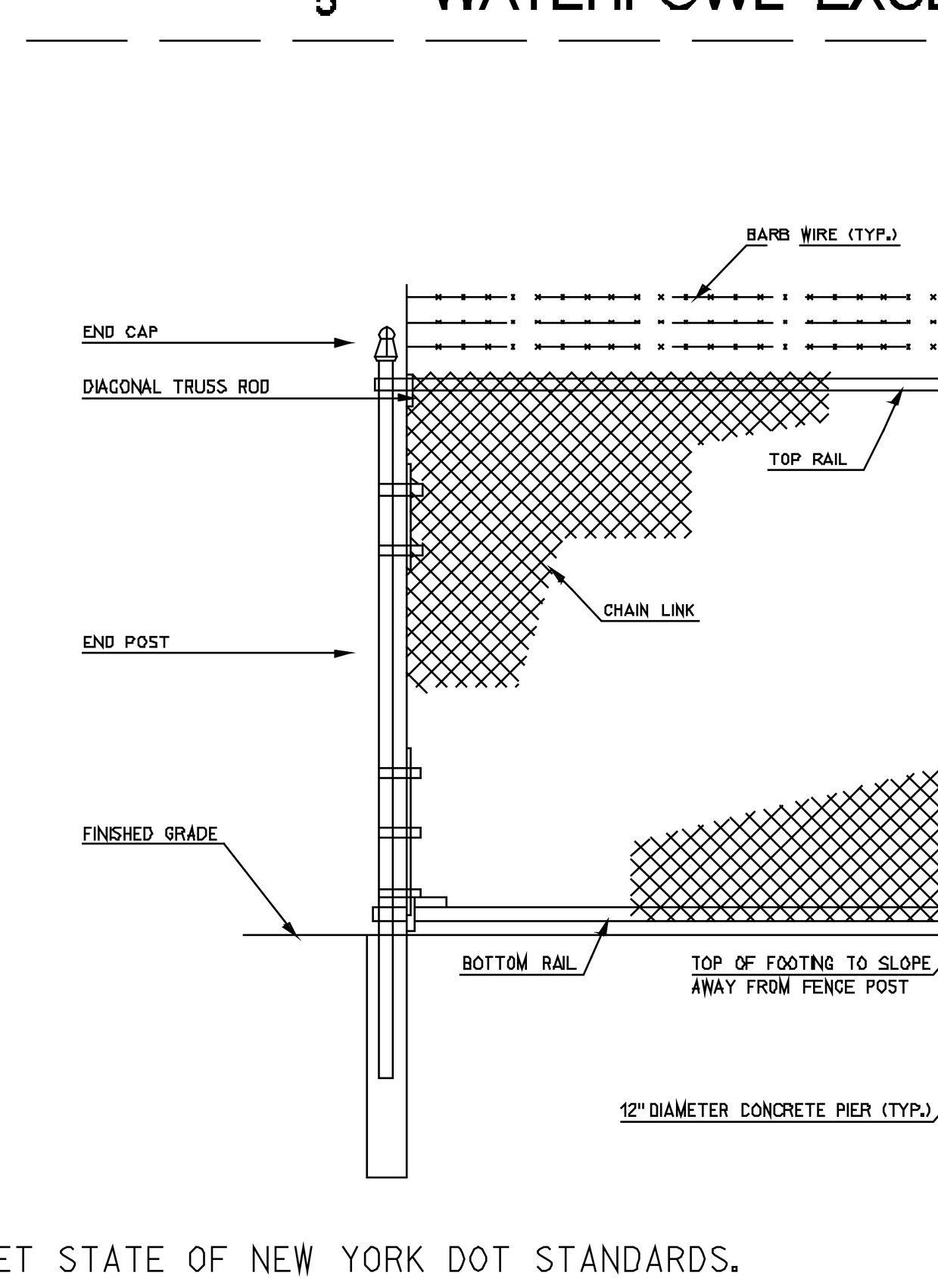
NOTE:

1. PERIMETER WATERFOWL EXCLUSION TO HAVE PINE STAKES AT 25:-0" O.C.

2. INTERIOR CELL PARTITIONS ARE TO BE 25'x25' (INTERIOR CELL PARTITIONING)

3. WATERFOWL EXCLUSION TO BE INSTALLED IN PLANTING ZONES 1, 2 & 4.

DETAIL 3 TYPICAL WATERFOWL FLAGGING AND PERIMETER FENCE



NOTES:

1. FENCE TO MEET STATE OF NEW YORK DOT STANDARDS.

2. NEW FENCE TO MEET HEIGHT OF EXISTING FENCE.

3. FENCE REMOVED TEMPORARILY FOR CONSTRUCTION SHALL BE REPLACED UPON COMPLETION OF WORK.

DETAIL 6 CHAIN LINK FENCE

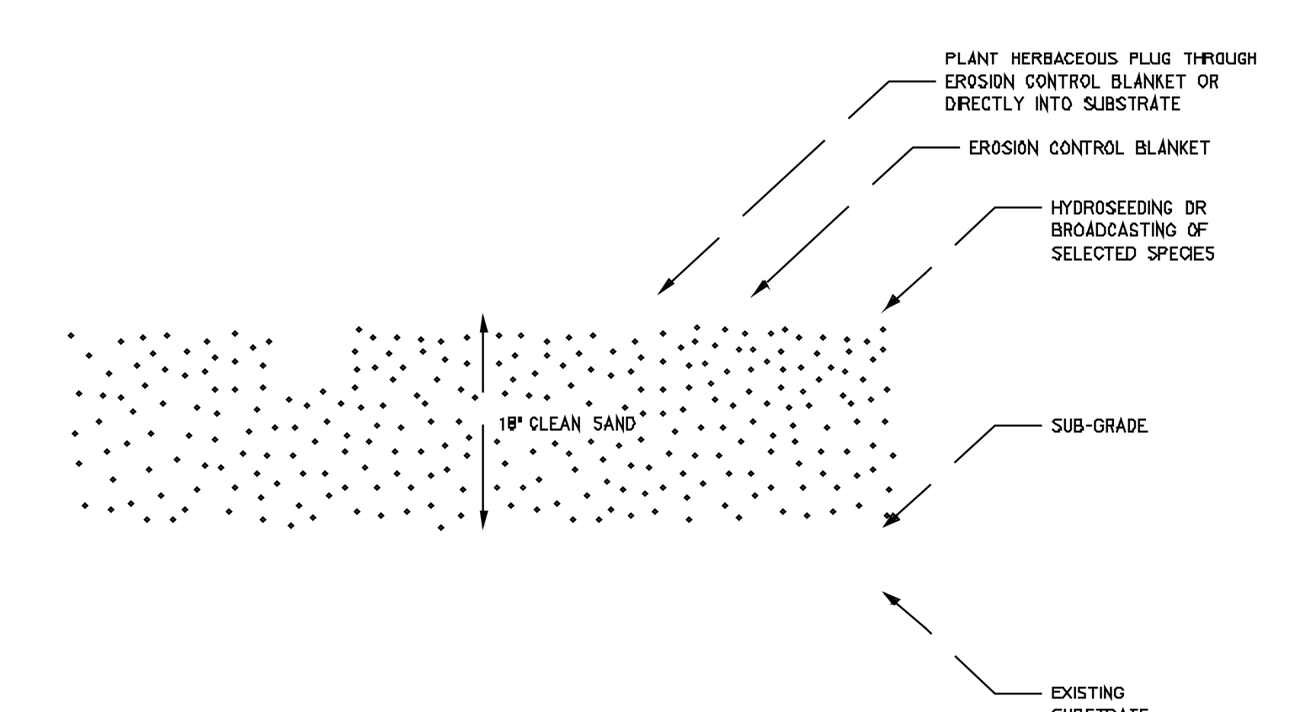
NOTES:

1. PLACE 18" PLANTING MEDIUM (CLEAN SAND) ON SUB-GRADE (HIGH MARSH ONLY).

2. SEED AS INDICATED IN SPECIFICATIONS ON PLANTING PLANS PL-1 AND PL-2.

3. INSTALL EROSION CONTROL BLANKET.

4. PLANT VEGETATION THROUGH FABRIC AS SHOWN ON PLANTING PLANS PL-1 AND PL-2.



DETAIL 9 HERBACEOUS 2" PLUG INSTALLATION (LOW & HIGH MARSH PLANTING / SEEDING)

US Army Corps of Engineers
New York District

Symbol	Description	Date	Appr.

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER NO. 72903

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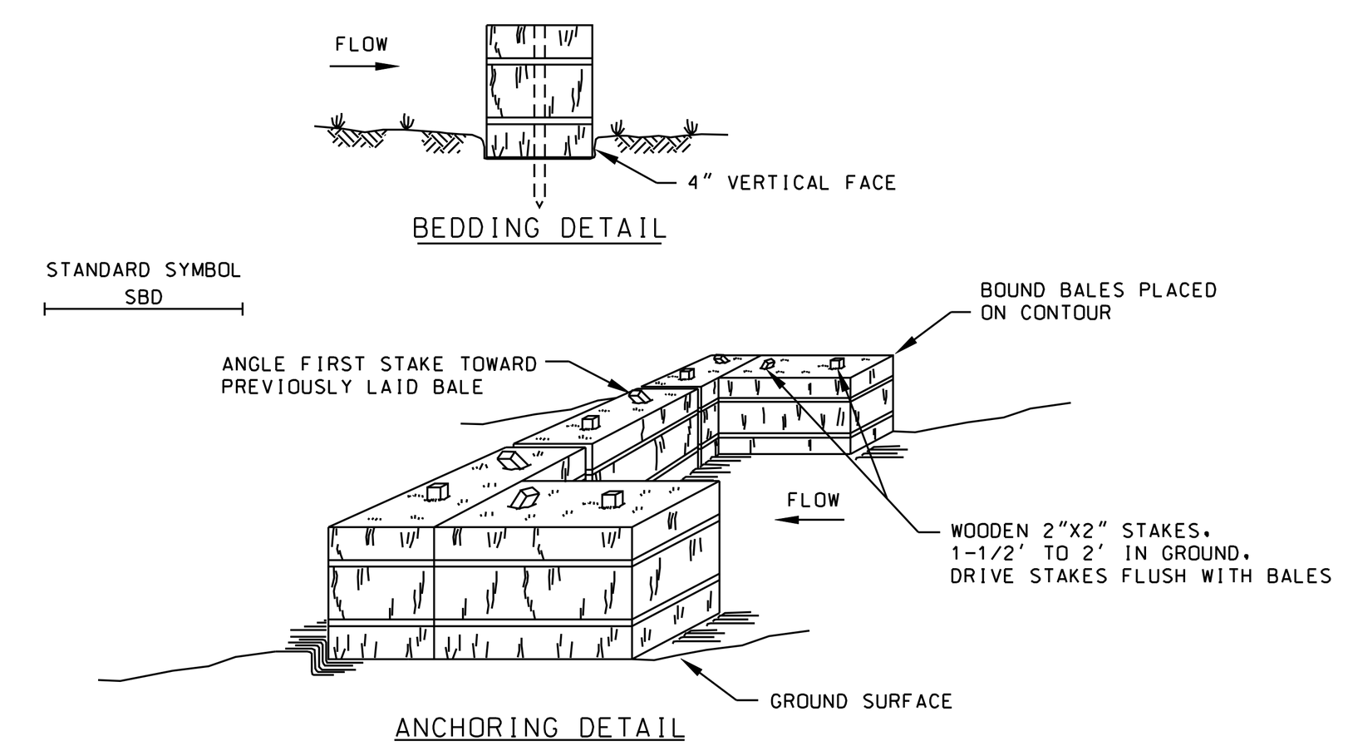
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION
TYPICAL DETAILS 1
STATEN ISLAND
NEW YORK

Sheet reference number: 11

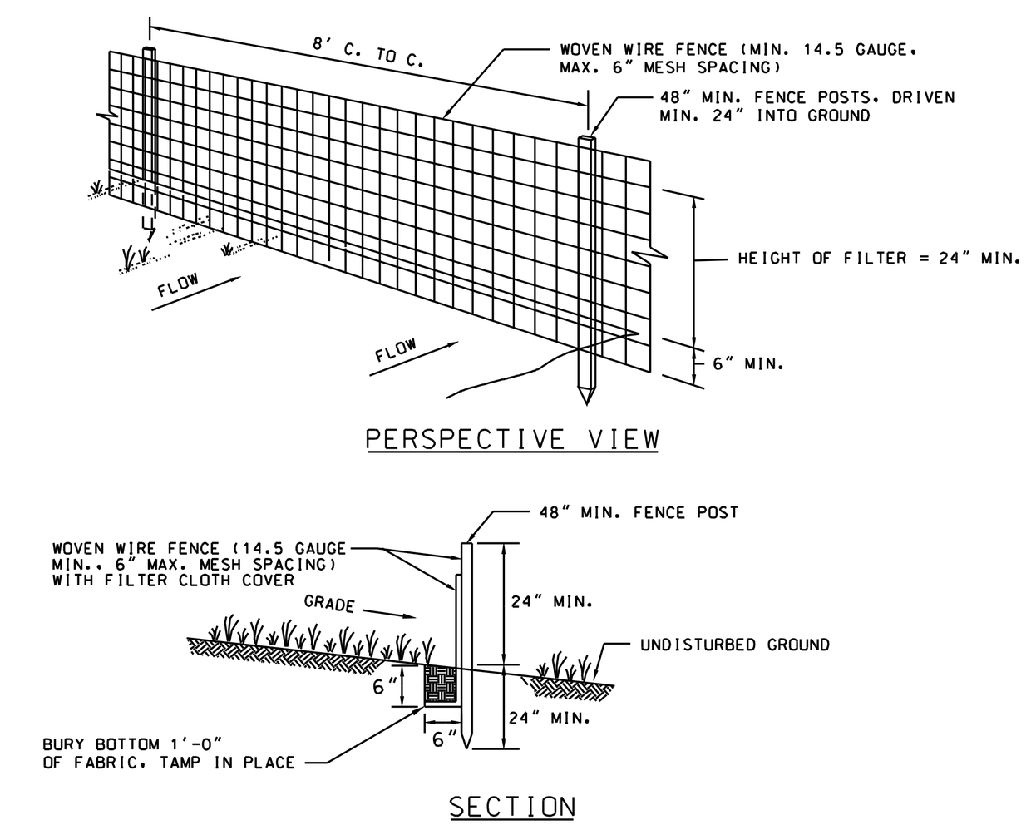


NOTES:

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE WILL BE EMBEDDED IN THE SOIL A MINIMUM OF FOUR (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY 2" X 2" WOODEN STAKES DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES ARE TO BE (DETAIL 15) DRIVEN IN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR/REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
6. THE SEDIMENT TRAP IS TO BE USED IN CONJUCTION WITH THE SEDIMENT FILTER BAG FOR PUMPED WATER (SHEET 11). THE SEDIMENT TRAP TO BE PLACED DOWN GRADIENT OF SEDIMENT FILTER BAG. THIS SYSTEM IS DESIGNED TO BE USED IN VARIOUS AREAS OF THE SITE ON AN AS-NEEDED BASIS TO DEWATER OPEN EXCAVATION AREAS.

NOT TO SCALE

DETAIL 10 SEDIMENT TRAP



NOTES:

1. WOVEN WIRE FENCE SHALL BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH SHALL BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY WILL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE WAS PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

POSTS: STEEL, EITHER T OR U TYPE OR 2" HARDWOOD

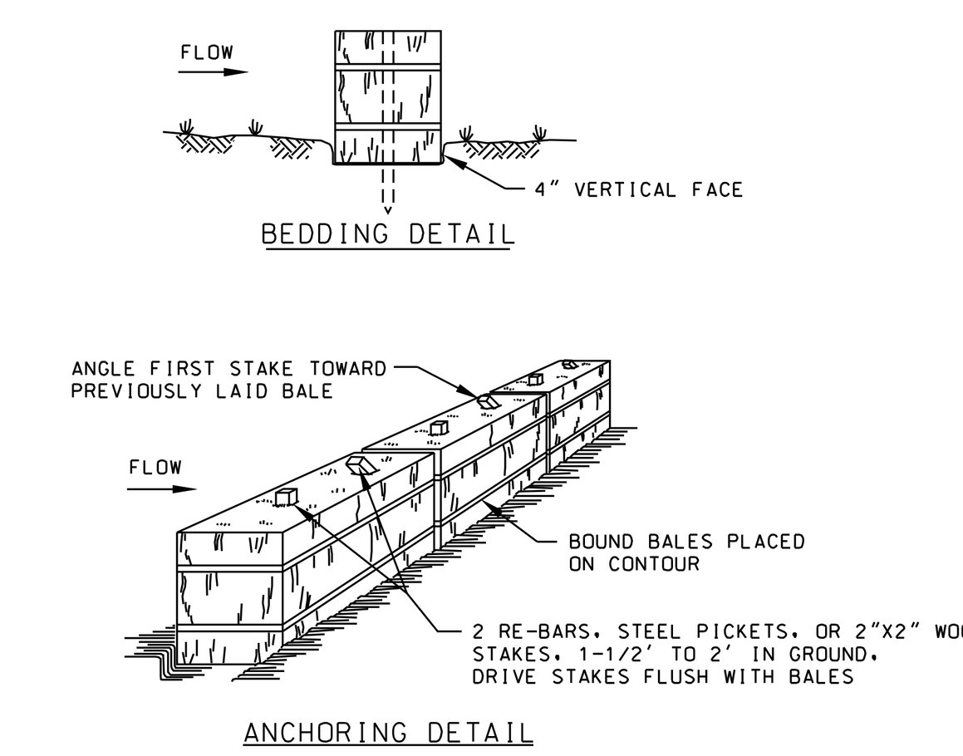
FENCE: WOVEN WIRE, 14.5 GA., 6" MAX. MESH OPENING

FILTER CLOTH: MANUFACTURED BY MIRAFI, EXXON CHEMICAL CO. OR APPROVED EQUAL

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE OR APPROVED EQUAL

NOT TO SCALE

DETAIL 12 SILT FENCE

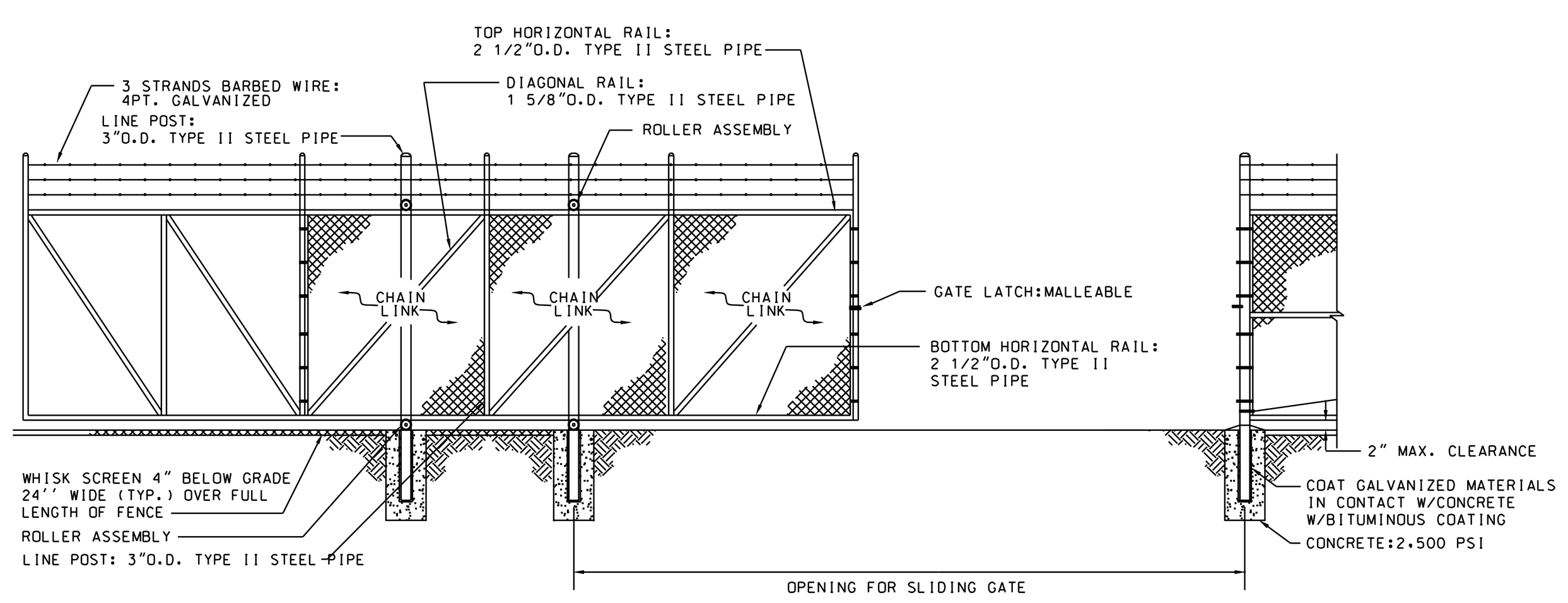


NOTES:

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF FOUR (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY 2" X 2" WOODEN STAKES DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES ARE TO BE DRIVEN IN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR/REPLACEMENT WAS MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

NOT TO SCALE

DETAIL 15 HAY BALE

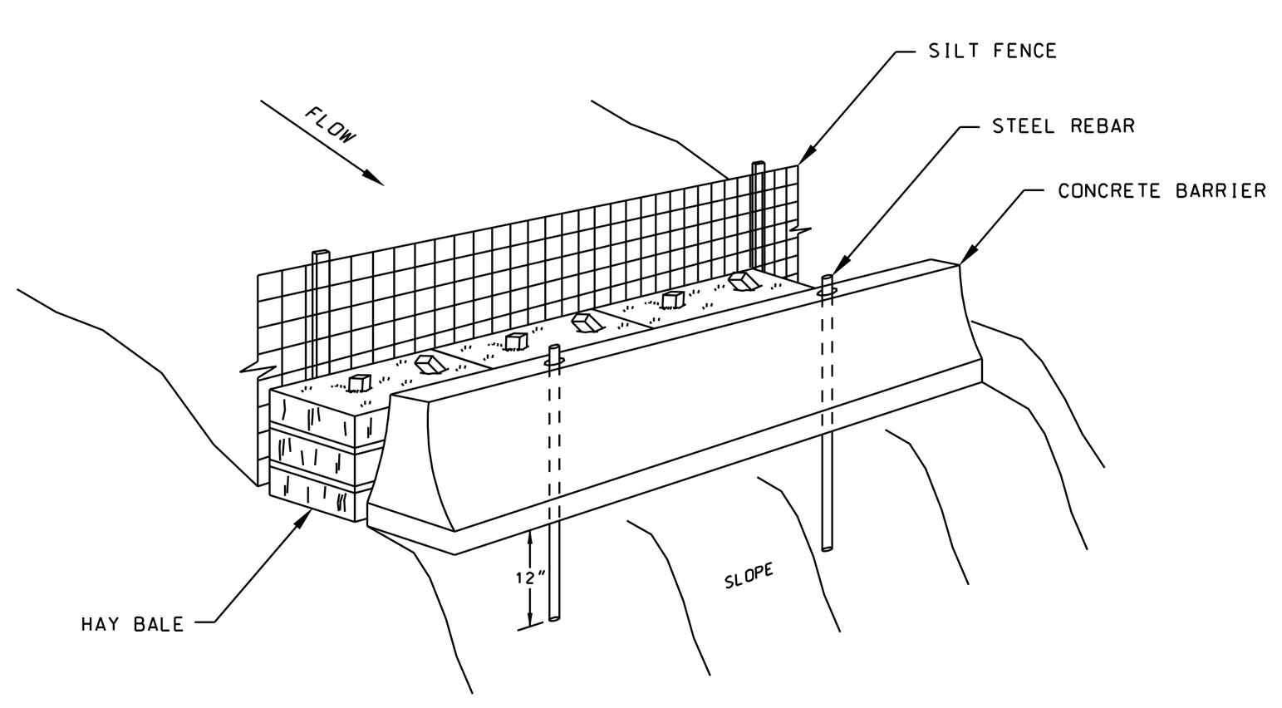


NOTES:

1. CONTRACTOR TO REMOVE THE MINIMAL AMOUNT OF EXISTING FENCING NECESSARY TO INSTALL THE ROLLER GATE.
2. HEIGHT OF ROLLER GATE TO MATCH HEIGHT OF EXISTING FENCING.

NOT TO SCALE

DETAIL 11 ROLLER GATE

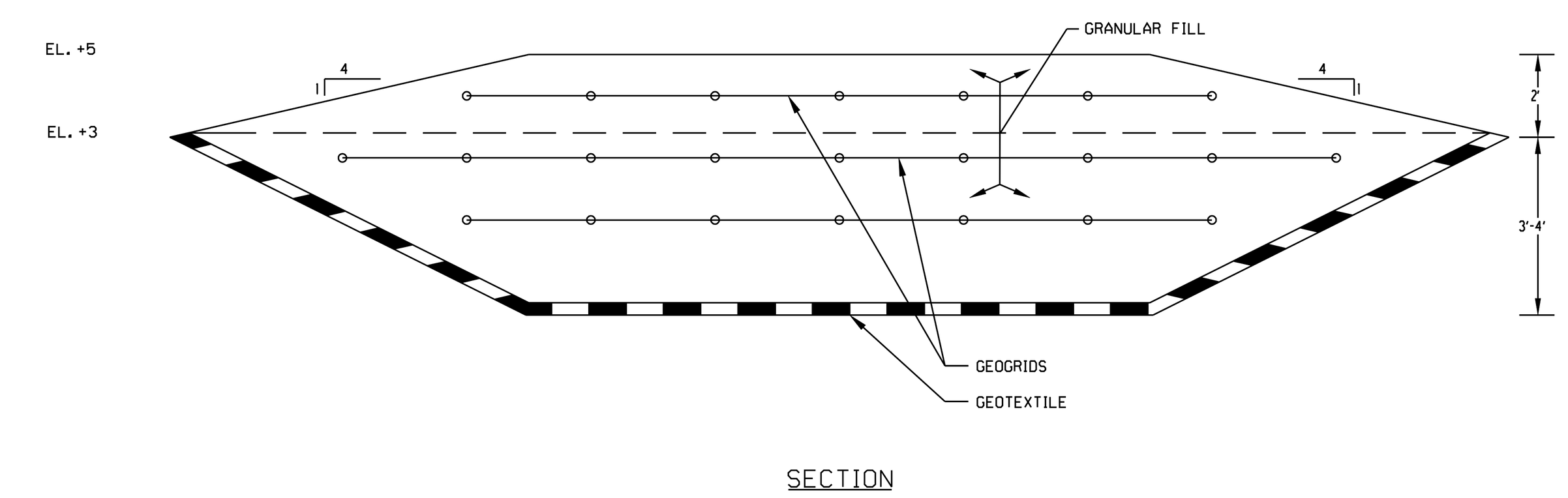


NOTES:

1. CONCRETE BARRIERS TO BE INSTALLED AT GRADE. STEEL REBAR SHALL BE INSTALLED THROUGH CONCRETE BARRIERS TO MINIMUM DEPTH OF 12" BELOW GRADE
2. HAYBALES TO BE INSTALLED IMMEDIATELY UP-SLOPE OF THE CONCRETE BARRIER IN ACCORDANCE WITH THE HAYBALE DETAIL.
3. SILT FENCE TO BE INSTALLED IMMEDIATELY UP-SLOPE OF THE HAYBALES IN ACCORDANCE WITH THE SILT FENCE DETAIL.
4. THE DEWATERING CONFINEMENT SYSTEM IS TO SURROUND THE PROPOSED STOCKPILE/DEWATERING AREA.
5. ALL EXCAVATED MATERIAL SHALL BE STOCKPILED UPSLOPE OF THE DEWATERING CONFINEMENT SYSTEM AND BE DEWATERED VIA DRAINAGE THROUGH THE DEWATERING CONFINEMENT SYSTEM PRIOR TO REMOVAL FROM THE PROJECT SITE.

NOT TO SCALE

DETAIL 13 DEWATERING CONFINEMENT SYSTEM

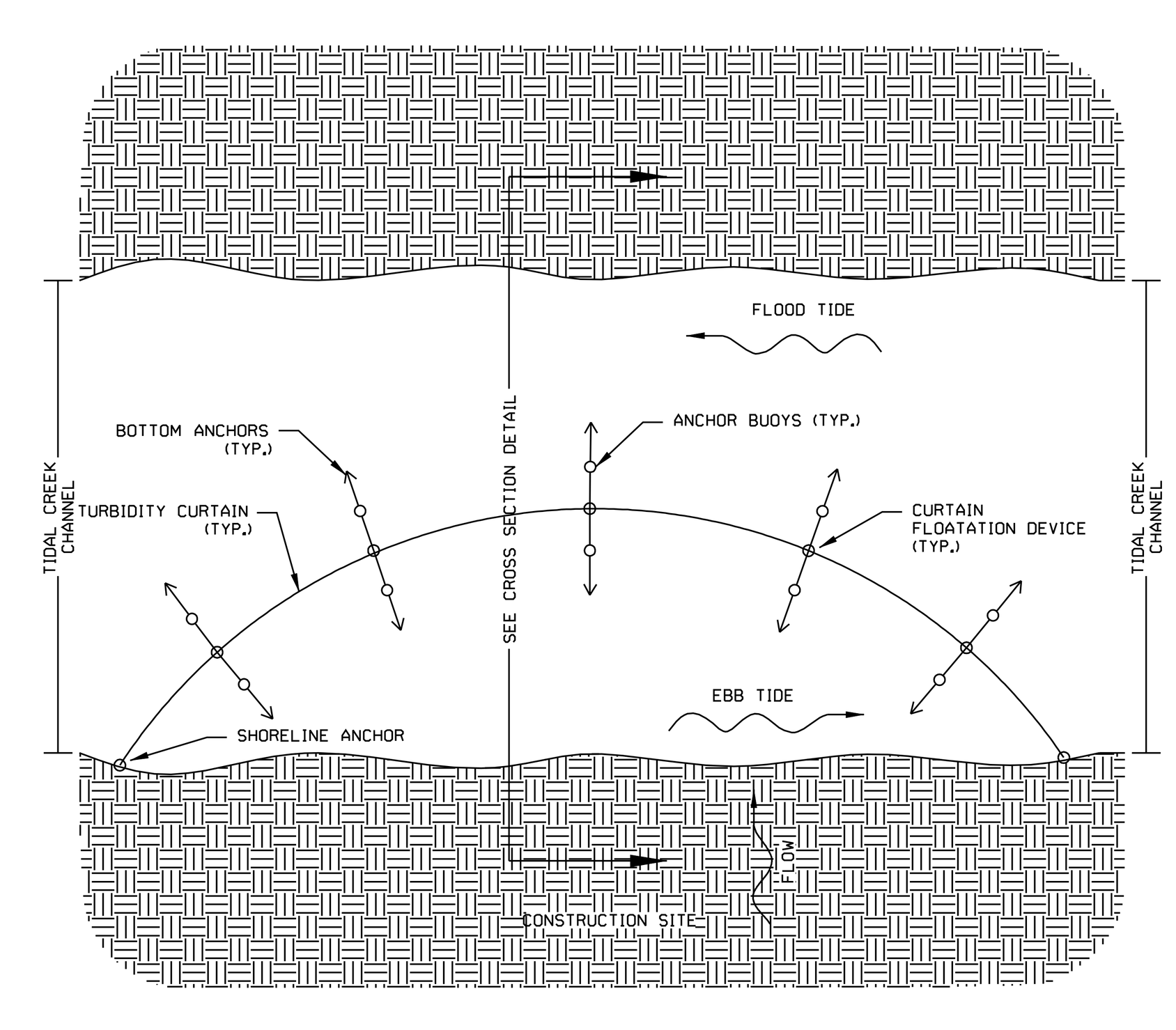


NOTES:

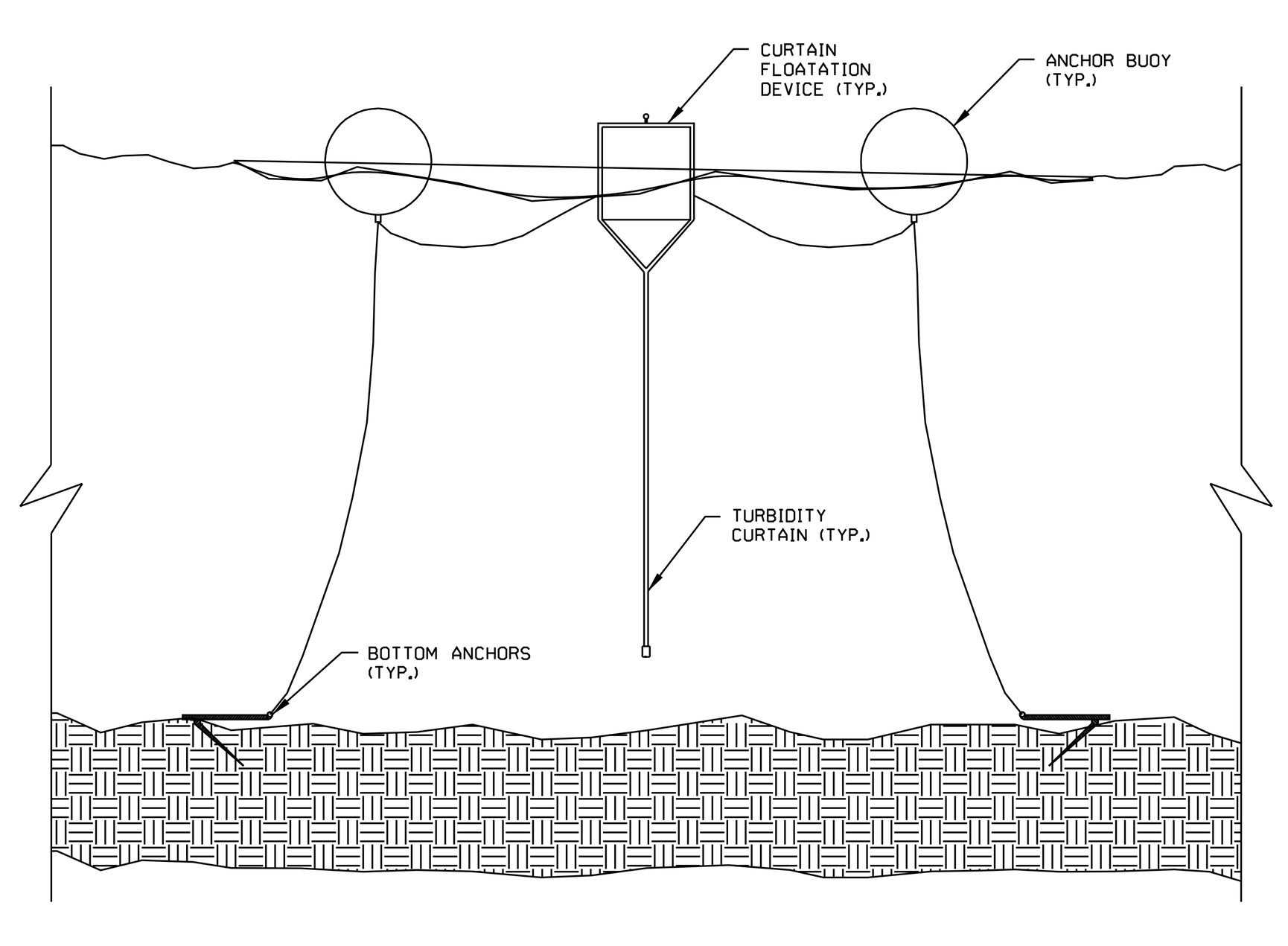
1. SETTLEMENT ANALYSIS INDICATE THAT TO ESTABLISH THE SURFACE OF HAUL ROADS AND WORKING PADS ABOUT TWO FEET ABOVE EXISTING GRADE IN AREAS OF WETLANDS, GRANULAR FILL, FIVE TO SIX FEET IN THICKNESS, MAY HAVE TO BE PLACED, EVEN WITH THE USE OF GEOTEXTILES AND GEOGRIDS. STABILITY ANALYSIS INDICATES THAT SIDE SLOPES OF FILL WILL HAVE TO BE GRADED AT 4H TO 1V OR FLATTER.
2. SETTLEMENT AND STABILITY ANALYSIS WERE PERFORMED CONSIDERING TYPICAL SOIL COMPRESSIBILITY AND STRENGTH PARAMETERS. THE LAYOUT OF GEOTEXTILES AND GEOGRIDS SHOWN ON THE SECTION IS SCHEMATIC. THE CONTRACTOR SHALL ESTABLISH THE ACTUAL CROSS SECTION(S) CONSIDERING THE SOIL CONDITIONS AT SPECIFIC LOCATIONS, THE TYPE OF FILL TO BE USED FOR CONSTRUCTION, THE TYPE OF EQUIPMENT TO BE SUPPORTED, THE STRENGTH AND NUMBER OF LAYERS OF GEOGRID, AND AMOUNT OF MAINTENANCE WHICH IS ACCEPTABLE DEPENDING ON THE COMPOSITION OF THE FILL AND THE STRENGTH OF THE SURFICIAL MATERIALS.
3. THE CONTRACTOR IS RESPONSIBLE FOR MOVING THE HAUL ROAD AND ACHIEVE FINAL GRADES INDICATED ON PLAN SHEET GP-1 WITH THE EXCEPTION OF SAND THAT CAN BE REUSED IN THE OVERCUT AREA. ANY ADDITIONAL MATERIAL (GRANULAR FILL, GEOTEXTILES, ETC.) USED IN THE HAUL ROAD MUST BE REMOVED AND DISPOSED OF OFF-SITE.

NOT TO SCALE

DETAIL 16 HAUL ROAD AND WORKING PADS

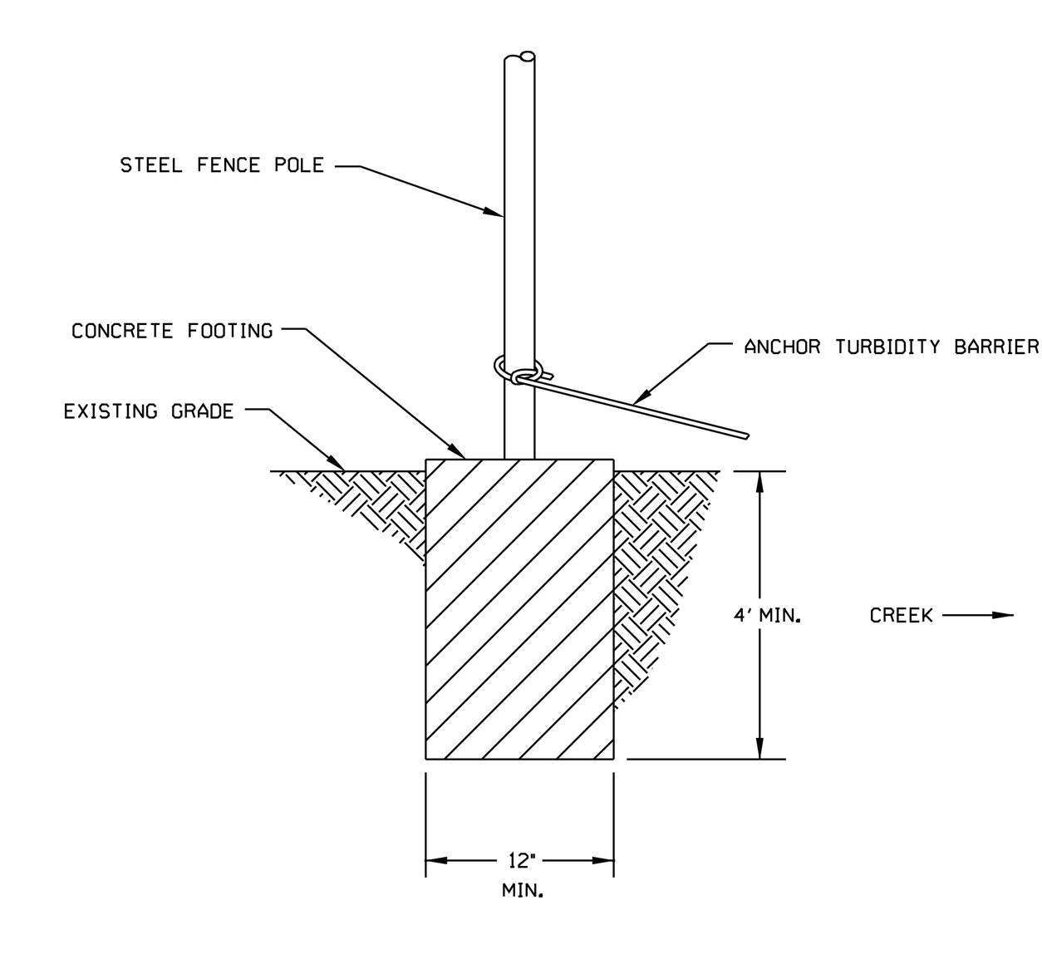


NOT TO SCALE

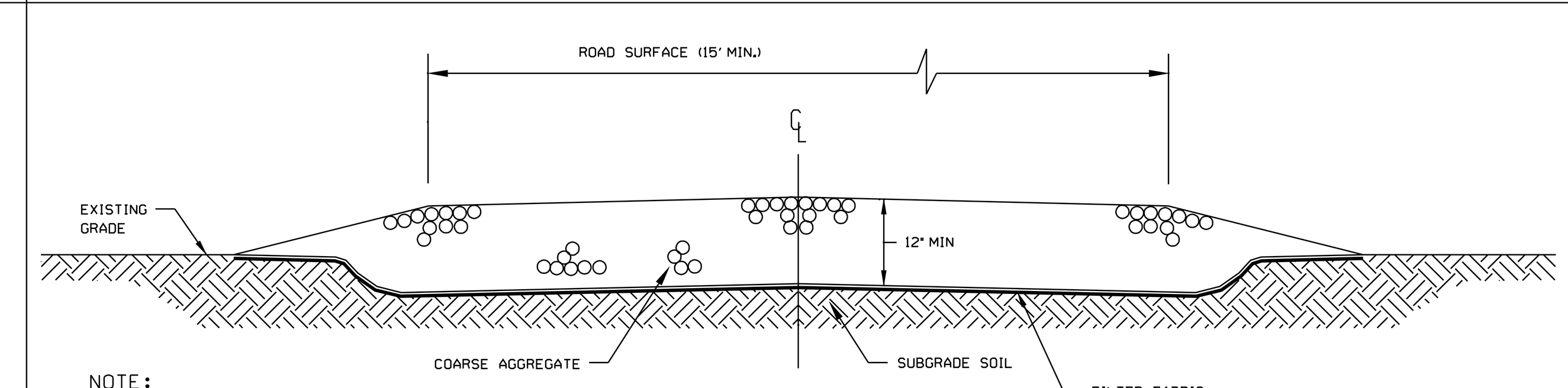


NOTES:

1. BARRIER MATERIAL WILL BE A BRIGHT YELLOW/ORANGE POLYETHYLENE PLASTIC OR POLYESTER SHEET, 10 MIL.. ANY SEAMS SHALL BE EITHER VULCANIZED OR SEWN AND SHALL DEVELOP THE FULL STRENGTH OF THE FABRIC.
2. BOTTOM ANCHORS, ANCHOR BUOYS, AND CURTAIN FLOATATION DEVICES SHALL BE INSTALLED AT A MAXIMUM SPAN OF 100 FEET BETWEEN LOCATIONS.
3. STANDARD SMALL CRAFT WARNING BUOYS SHALL BE LOCATED ALONG THE BARRIER AT A MINIMUM OF 100 FOOT INTERVALS.



DETAIL 14 FLOATING TURBIDITY BARRIER



NOTE:

1. SETTLEMENT AND STABILITY ANALYSIS WERE PERFORMED CONSIDERING TYPICAL SOIL COMPRESSIBILITY AND STRENGTH PARAMETERS. THE LAYOUT OF AGGREGATE AND FILTER FABRIC SHOWN ON THE SECTION IS SCHEMATIC. THE CONTRACTOR SHALL ESTABLISH THE ACTUAL CROSS SECTION(S) CONSIDERING THE SOIL CONDITIONS AT SPECIFIC LOCATIONS, THE TYPE OF FILL TO BE USED FOR CONSTRUCTION, THE TYPE OF EQUIPMENT TO BE SUPPORTED, THE MAINTENANCE WHICH IS ACCEPTABLE DEPENDING ON THE COMPOSITION OF THE FILL AND THE STRENGTH OF COMPOSITION THE SURFICIAL MATERIALS.

NOT TO SCALE

DETAIL 17 STABILIZED CONSTRUCTION ENTRANCE

SOIL EROSION AND SEDIMENT CONTROL NOTES:

1. See specifications section: 01553.
2. All Soil Erosion and Sediment Control practices to be installed prior to any major surface disturbance.
3. Any disturbed areas that will be left exposed more than 30 days, and not subject to construction traffic, shall immediately receive a temporary seeding of annual winter rye (Lelium multiflorum) @ 50lbs./acre. To be hydroseeded in accordance w/Soil Erosion and Sediment Control Specifications (#01553) and Seeding Specifications (#02236). If the season prevents the establishment of a temporary cover, the disturbed areas shall be multched with or equivalent material, at a rate of two (2) tons per acre.
4. Permanent vegetation to be seeded or sodded on all exposed areas within ten (10) days after final grading. Mulch to be used as necessary for protection until growth is established.
5. All work to be done in accordance with the Standards for Soil Erosion and Sediment Control Specifications (#01553).
6. Immediately following initial disturbance or rough grading, all critical areas subject to erosion (i.e. steep slopes and roadway embankments) will receive a temporary seeding in combination with straw mulch or a suitable equivalent, at a rate of two (2) tons per acre.
7. Any soil utilized for soil stabilization having a pH of 4 or less or containing iron sulfides shall be covered with a minimum of 12 inches of soil having a pH of 5 or more prior to seedbed preparation.
8. At the time when the site preparation for permanent vegetative stabilization is going to be accomplished, any soil that will not provide a suitable environment to support adequate vegetative ground cover, shall be removed or treated in such a way that will permanently adjust the soil conditions and render it suitable for vegetative ground cover.
9. Any Conduit Outlet Protection must be installed at all required outfalls prior to the drainage system becoming operational. Outlet protection shall be the placement of Riprap.

US Army Corps of Engineers
New York District

Symbol	Description	Date	Appr.

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER NO. 72903

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: BB	Date: April 2005	Size:	Rev.:
Dwn by: SH	Ckd by: BC	Drawing file no.:	
Reviewed by:		Drawing code:	

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION
TYPICAL DETAILS 2
STATEN ISLAND
NEW YORK

Sheet reference number:
12

B-1

MATRIX ENVIRONMENTAL & GEOTECHNICAL SERVICES, INC.
GEOTECHNICAL FIELD SERVICES DIVISION
BORING LOG

Date: 1/10/03 | Started: 11:30 AM | Finished: 12:15 PM | Sheet 1 of 1
Borehole No.: B-1 | Water Depth: 2' 3" | Date: 1/10/03

Project: B.U.G. Wetlands Restoration Site, MATRIX No. 00P133E-4
Inspector: H. Hickerson
Drilling Contractor: Soil Mechanics Drilling Corp
Drilling Equipment: Tripod
Driller:
Location: Staten Island, NY
Coordinates:
Ground Elevation: -1.6'
Casing: NA | Sampler: Split Spoon
Casing: O.D.: NA I.D.: NA | Sample: O.D.: 2" I.D.: 1 3/8"
Hammer Weight/Fall: 140 lb. / 30"

Depth (feet)	Graphic Log	USCS Symbol	Sample (Depth)	Description and Remarks	Sampler Blows / 6"	N (SPT)	Rec. (in.)
		FILL	S1 (0'-2')	Red-brn SILT, some cf Sand, trace cf Gravel, Fill	1-2-2-2	4	6"
		FILL OL	S2 (2'-4')	Top 5": Same As Above Bottom 15": Blk Organic Silt, some layers of Peat	1-2-1-2	3	20"
		PEAT	S3 (4'-6')	Blk-grn PEAT, little Organic Silt	WOH-WOH-2-2	2	24"
		PEAT	S4 (6'-8')	Same As Above	WOH-WOH WOH-WOH	WOH	10"
		PEAT	S5 (8'-10')	Same As Above	WOH-WOH WOH-WOH	WOH	20"
				EOB at 10.0'			

B-2

MATRIX ENVIRONMENTAL & GEOTECHNICAL SERVICES, INC.
GEOTECHNICAL FIELD SERVICES DIVISION
BORING LOG

Date: 1/10/03 | Started: 12:30 PM | Finished: 1:15 PM | Sheet 1 of 1
Borehole No.: B-2 | Water Depth: 1" | Date: 1/10/03

Project: B.U.G. Wetlands Restoration Site, MATRIX No. 00P133E-4
Inspector: H. Hickerson
Drilling Contractor: Soil Mechanics Drilling Corp
Drilling Equipment: Tripod
Driller:
Location: Staten Island, NY
Coordinates:
Ground Elevation: -2.2'
Casing: NA | Sampler: Split Spoon
Casing: O.D.: NA I.D.: NA | Sample: O.D.: 2" I.D.: 1 3/8"
Hammer Weight/Fall: 140 lb. / 30"

Depth (feet)	Graphic Log	USCS Symbol	Sample (Depth)	Description and Remarks	Sampler Blows / 6"	N (SPT)	Rec. (in.)
		OL	S1 (0'-2')	Dark Gry Organic SILT, some root and plant matter present	1-1-2-1	3	2"
		OL	S2 (2'-4')	Same As Above	WOH-WOH WOH-WOH	WOH	3"
		PEAT	S3 (4'-6')	Blk-grn PEAT	WOH-WOH WOH-WOH	WOH	3"
		PEAT	S4 (6'-8')	Same As Above	WOH-WOH WOH-WOH	WOH	3"
		PEAT	S5 (8'-10')	Same As Above	WOH-WOH WOH-WOH	WOH	12"
				EOB at 10.0'			

B-3

MATRIX ENVIRONMENTAL & GEOTECHNICAL SERVICES, INC.
GEOTECHNICAL FIELD SERVICES DIVISION
BORING LOG

Date: 1/13/03 | Started: 8:00 AM | Finished: 8:30 AM | Sheet 1 of 1
Borehole No.: B-3 | Water Depth: 4' | Date: 1/13/03

Project: B.U.G. Wetlands Restoration Site, MATRIX No. 00P133E-4
Inspector: H. Hickerson
Drilling Contractor: Soil Mechanics Drilling Corp
Drilling Equipment: Hand Operated Spoon and Hammer
Driller:
Location: Staten Island, NY
Coordinates:
Ground Elevation: 5.1'
Casing: NA | Sampler: Split Spoon
Casing: O.D.: NA I.D.: NA | Sample: O.D.: 2" I.D.: 1 3/8"
Hammer Weight/Fall: 35 lb / 24"

Depth (feet)	Graphic Log	USCS Symbol	Sample (Depth)	Description and Remarks	Sampler Blows / 6"	N (SPT)	Rec. (in.)
		SM	S1 (0'-2')	Brn SILT and fc SAND, plant material, Fill	WOH-1-5-3	6	2"
		SM	S2 (2'-4')	Same As Above	3-5-12-14	17	2"
		PEAT	S3 (4'-6')	Blk-grn PEAT	WOH-WOH-1-1	1	8"
				EOB at 6.0'			

B-4

MATRIX ENVIRONMENTAL & GEOTECHNICAL SERVICES, INC.
GEOTECHNICAL FIELD SERVICES DIVISION
BORING LOG

Date: 1/13/03 | Started: 9:00 AM | Finished: 9:30 AM | Sheet 1 of 1
Borehole No.: B-4 | Water Depth: 6" | Date: 1/13/03

Project: B.U.G. Wetlands Restoration Site, MATRIX No. 00P133E-4
Inspector: H. Hickerson
Drilling Contractor: Soil Mechanics Drilling Corp
Drilling Equipment: Hand Operated Spoon and Hammer
Driller:
Location: Staten Island, NY
Coordinates:
Ground Elevation: 1.9'
Casing: NA | Sampler: Split Spoon
Casing: O.D.: NA I.D.: NA | Sample: O.D.: 2" I.D.: 1 3/8"
Hammer Weight/Fall: 35 lb / 24"

Depth (feet)	Graphic Log	USCS Symbol	Sample (Depth)	Description and Remarks	Sampler Blows / 6"	N (SPT)	Rec. (in.)
		SM OL	S1 (0'-2')	Top 6": Brn SILT and fc SAND, plant material, Fill Bottom 14": Blk Organic SILT, some Peat	1-2-2-2	4	20"
				EOB at 2.0'			

B-5

MATRIX ENVIRONMENTAL & GEOTECHNICAL SERVICES, INC.
GEOTECHNICAL FIELD SERVICES DIVISION
BORING LOG

Date: 1/10/03 | Started: 10:00 AM | Finished: 10:30 AM | Sheet 1 of 1
Borehole No.: B-5 | Water Depth: 2" | Date: 1/10/03

Project: B.U.G. Wetlands Restoration Site, MATRIX No. 00P133E-4
Inspector: H. Hickerson
Drilling Contractor: Soil Mechanics Drilling Corp
Drilling Equipment: Hand Operated Spoon and Hammer
Driller:
Location: Staten Island, NY
Coordinates:
Ground Elevation: 2.3'
Casing: NA | Sampler: Split Spoon
Casing: O.D.: NA I.D.: NA | Sample: O.D.: 2" I.D.: 1 3/8"
Hammer Weight/Fall: 35 lb / 24"

Depth (feet)	Graphic Log	USCS Symbol	Sample (Depth)	Description and Remarks	Sampler Blows / 6"	N (SPT)	Rec. (in.)
		SM	S1 (0'-2')	Brn SILT and fc SAND, plant material, Fill	1-2-2-3	4	6"
		OL	S2 (2'-4')	Blk Organic SILT and PEAT	1-WOH-WOH-WOH	WOH	6"
				EOB at 4.0'			

B-6

MATRIX ENVIRONMENTAL & GEOTECHNICAL SERVICES, INC.
GEOTECHNICAL FIELD SERVICES DIVISION
BORING LOG

Date: 1/10/03 | Started: 10:15 AM | Finished: 11:00 AM | Sheet 1 of 1
Borehole No.: B-6 | Water Depth: 1' 6" | Date: 1/10/03

Project: B.U.G. Wetlands Restoration Site, MATRIX No. 00P133E-4
Inspector: H. Hickerson
Drilling Contractor: Soil Mechanics Drilling Corp
Drilling Equipment: Tripod
Driller:
Location: Staten Island, NY
Coordinates:
Ground Elevation: 3.7'
Casing: NA | Sampler: Split Spoon
Casing: O.D.: NA I.D.: NA | Sample: O.D.: 2" I.D.: 1 3/8"
Hammer Weight/Fall: 140 lb. / 30"

Depth (feet)	Graphic Log	USCS Symbol	Sample (Depth)	Description and Remarks	Sampler Blows / 6"	N (SPT)	Rec. (in.)
		ML	S1 (0'-2')	Brn SILT, little fc SAND, little Peat, Fill	1-1-1-2	2	16"
		ML	S2 (2'-4')	Same As Above	1-2-2-2	4	5"
		PEAT	S3 (4'-6')	PEAT and Blk Organic Silt	1-1-2-1	3	15"
		PEAT	S4 (6'-8')	Same As Above	1-WOH-WOH-WOH	WOH	15"
		PEAT	S5 (8'-10')	Same As Above	WOH-WOH WOH-WOH	WOH	16"
				EOB at 10.0'			

B-7

MATRIX ENVIRONMENTAL & GEOTECHNICAL SERVICES, INC.
GEOTECHNICAL FIELD SERVICES DIVISION
BORING LOG

Date: 1/09/03 | Started: 12:15 PM | Finished: 12:45 PM | Sheet 1 of 1
Borehole No.: B-7 | Water Depth: 4' | Date: 1/09/03

Project: B.U.G. Wetlands Restoration Site, MATRIX No. 00P133E-4
Inspector: H. Hickerson
Drilling Contractor: Soil Mechanics Drilling Corp
Drilling Equipment: Truck Mounted Rig
Driller:
Location: Staten Island, NY
Coordinates:
Ground Elevation: 7.7'
Casing: NA | Sampler: Split Spoon
Casing: O.D.: NA I.D.: NA | Sample: O.D.: 2" I.D.: 1 3/8"
Hammer Weight/Fall: 140 lb. / 30"

Depth (feet)	Graphic Log	USCS Symbol	Sample (Depth)	Description and Remarks	Sampler Blows / 6"	N (SPT)	Rec. (in.)
		SM	S1 (0'-2')	Brn fc SAND, some fc Gravel, little brn Silt, plant material present, Fill	1-2-1-1	3	10"
		ML	S2 (2'-4')	Brn SILT, some fc Sand, trace Gravel, building materials present, brick, wood, Fill	3-2-1-1	3	6"
		ML	S3 (4'-6')	Same As Above	1-1-WOH-1	1	8"
		SP	S4 (6'-8')	Tan fc SAND, little brn Silt	WOH-WOH WOH-3	WOH	10"
		SP	S5 (8'-10')	Same As Above	1-WOH-1-WOH	1	13"
				EOB at 10.0'			

B-8

MATRIX ENVIRONMENTAL & GEOTECHNICAL SERVICES, INC.
GEOTECHNICAL FIELD SERVICES DIVISION
BORING LOG

Date: 1/09/03 | Started: 1:00 PM | Finished: 2:10 PM | Sheet 1 of 1
Borehole No.: B-8 | Water Depth: 2' 2" | Date: 1/09/03

Project: B.U.G. Wetlands Restoration Site, MATRIX No. 00P133E-4
Inspector: H. Hickerson
Drilling Contractor: Soil Mechanics Drilling Corp
Drilling Equipment: Truck Mounted Rig
Driller:
Location: Staten Island, NY
Coordinates:
Ground Elevation: 3.8'
Casing: NA | Sampler: Split Spoon
Casing: O.D.: NA I.D.: NA | Sample: O.D.: 2" I.D.: 1 3/8"
Hammer Weight/Fall: 140 lb. / 30"

Depth (feet)	Graphic Log	USCS Symbol	Sample (Depth)	Description and Remarks	Sampler Blows / 6"	N (SPT)	Rec. (in.)
		ML	S1 (0'-2')	Red/brn SILT and fm SAND, little fc Gravel, bricks, roots, Fill	1-4-31	7	11"
		GM	S2 (2'-4')	Red/Gry fc GRAVEL, some fc Sand, little red Silt, roots and building material, Fill	3-2-8-27	10	12"
		PEAT/O	S3 (4'-6')	Gry Organic SILT and brn PEAT	1-1-WOH-1	1	14"
		PEAT/O	S4 (6'-8')	Red/brn fm GRAVEL and fc SAND, little red Silt, building debris, material possibly fell into hole from high elevation during sampling	WOH-WOH-WOH-WOH	WOH	3"
		OL	S5 (8'-10')	Gry/grn Orgainc SILT	WOH-WOH-WOH-WOH	WOH	12"
				EOB at 10.0'			

B-9

MATRIX ENVIRONMENTAL & GEOTECHNICAL SERVICES, INC.
GEOTECHNICAL FIELD SERVICES DIVISION
BORING LOG

Date: 1/10/03 | Started: 7:45 AM | Finished: 8:30 AM | Sheet 1 of 1
Borehole No.: B-9 | Water Depth: 3' 6" | Date: 1/10/03

Project: B.U.G. Wetlands Restoration Site, MATRIX No. 00P133E-4
Inspector: H. Hickerson
Drilling Contractor: Soil Mechanics Drilling Corp
Drilling Equipment: Truck Mounted Rig
Driller:
Location: Staten Island, NY
Coordinates:
Ground Elevation: 6.2'
Casing: NA | Sampler: Split Spoon
Casing: O.D.: NA I.D.: NA | Sample: O.D.: 2" I.D.: 1 3/8"
Hammer Weight/Fall: 140 lb. / 30"

Depth (feet)	Graphic Log	USCS Symbol	Sample (Depth)	Description and Remarks	Sampler Blows / 6"	N (SPT)	Rec. (in.)
		SM	S1 (0'-2')	No Recovery	1-1-2-1	3	0"
		SM	S2 (2'-4')	Red/brn fc SAND and fc GRAVEL, little brn Silt, root and plant material present	1-1-1-2	2	3"
		SP	S3 (4'-6')	Tan/Gray fc SAND, trace f Gravel, little Silt, wet	3-3-4-3	7	8"
		SP	S4 (6'-8')	Same As Above	3-2-1-2	3	18"
		SP OL	S5 (8'-10')	Top 16": Same As Above Bottom 8": Black Organic Silt, some fc Sand	WOH-WOH-WOH-2	WOH	24"
				EOB at 10.0'			

US Army Corps of Engineers
New York District

Symbol	Description	Date	Appr.

Jayne Warne, P.E.
N.Y. PROFESSIONAL ENGINEER NO. 72903

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: BB | Dwn by: SH | Ckd by: BC | Reviewed by: | Date: April 2005 | Drawing file no.: | Drawing code: | Size: | Rev.:

BROOKLYN UNION GAS SITE
SALT MARSH RESTORATION
BORING LOGS
STATEN ISLAND
NEW YORK

Sheet reference number: 13